Environmental Impact Analysis Process

DRAFT ENVIRONMENTAL ASSESSMENT

SAC LOW-ALTITUDE FLIGHT OPERATIONS AT THE AIRBURST RANGE, COLORADO

January 26, 1990

U. S. AIR FORCE
STRATEGIC AIR COMMAND

Acronyms and Abbreviations

AAMRL	Armstrong Aerospace Medical Research Laboratory
AFB	Air Force Base
AGGR	Air-to-Ground Gunnery Range
AGL	above ground level
AICUZ	Air Installation Compatible Use Zone
ANG	Air National Guard
ATC	air traffic control
AUM	animal unit month
BAM	Bird Avoidance Model
BASH	bird-aircraft strike hazard
BLM	Bureau of Land Management
CAQCC	Colorado Air Quality Control Commission
CDOW	Colorado Division of Wildlife
CEP	circular error of probability
CEQ	Council on Environmental Quality
CERT	Conventional Enhanced Release Training
CFR	Code of Federal Regulations
DACM	Dissimilar Air Combat Maneuvering
dB	decibel
dBA	decibel, adjusted to the A-scale
DOD	Department of Defense
DOI	Department of the Interior
DOT	Department of Transportation
DRF	Disaster Response Force
EA	environmental assessment
EIAP	Environmental Impact Analysis Process
EIS	environmental impact statement
EPA	U.S. Environmental Protection Agency
EWEP	Electronic Warfare Evaluation Program
EWO	Emergency War Order
FAA	Federal Aviation Administration
FAR	Federal Aviation Regulation
FCMR	Fort Carson Military Range
FLIP	Flight Information Publication
FONSI	finding of no significant impact
FSS	flight service station
gpm	gallons per minute
HPP	Historic Preservation Plan
HUD	Housing and Urban Development
ICUZ	Installation Compatible Use Zone
IFR	instrument flight rules
IMC	instrument meteorological conditions
IR	instrument route
ISO	International Standards Organization
KIAS	knots indicated airspeed
KTAS	knots true airspeed
LANTIRN	Low-Altitude Navigational Targeting Infrared for Night
L_{dn}	day-night sound level average measured in dBA
L_{dnmr}	monthly day-night sound level measured in dBA
mgd	million gallons per day
mg/l	milligrams per liter
mg/m^3	milligrams per cubic meter
MOA	Military Operations Area
MSL	mean sea level
MTR	Military Training Route
NAAQS	National Ambient Air Quality Standards
NASA	National Aeronautics and Space Administration
NG	National Grasslands
NM	nautical miles (approximately 1.15 statute miles)
NOAA	National Oceanic and Atmospheric Administration
NOTAM	Notice to airmen
NRHP	National Register of Historic Places
NWR	National Wildlife Refuge
OPR	Office of Primary Responsibility
ORNL	Oak Ridge National Laboratories
ORV	off-road vehicle
PCMS	Pinon Canyon Maneuver Site
PPACG	Pikes Peak Area Council of Governments
ppm	parts per million
RCO	Range Control Officer
REP	Reconnaissance Evaluation Program
SAC	Strategic Air Command
SCS	Soil Conservation Service
SHPO	State Historic Preservation Office
SIP	State Implementation Plan
STR	Strategic Training Range
STRC	Strategic Training Range Complex
SWA	State Wildlife Area
TAC	Tactical Air Command
TDS	total dissolved solids
TFG	Tactical Fighter Group
TFW	Tactical Fighter Wing
TFWC	Tactical Fighter Weapons Center
ug/m^3	micrograms per cubic meter
USC	United States Code
USFWS	U.S. Fish and Wildlife Service
VFR	visual flight rules
VR	visual route
WESP	Weapons Evaluation Systems Program

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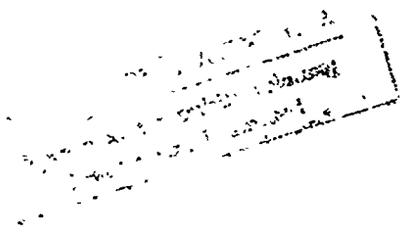

U.S. Air Force
Strategic Air Command

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1.0 INTRODUCTION

This environmental assessment (EA) examines the potential environmental impacts of U.S. Air Force Strategic Air Command (SAC) flights along low-level military training route (MTR) IR-409 and low-altitude weapons training operations at the Airburst Range in southcentral Colorado.

1.1 PURPOSE AND NEED

1.1.1 Low-Level Training

Low-altitude flight operations are essential to the Air Force for a diversity of activities ranging from pilot and navigator training to research, development, test, and evaluation programs. The Air Force requires use of airspace below 3,000 feet above ground level (AGL) to achieve and sustain aircrew proficiency for missions involving air defense, air superiority, close strategic and tactical bombing, and strategic/tactical airlift. Aircrew proficiency is essential if the Air Force is to perform its assigned missions in support of national policies.

With the exception of a few, newer, "over-the-horizon" targeting radar systems, most radars work on the principal of line-of-sight acquisition and tracking (i.e., approaching aircraft cannot be detected by traditional radar systems until the aircraft are above the horizon). Because of the curvature of the earth's surface, the lower an aircraft flies, the longer it will remain below the horizon. Consequently, in combat SAC bombers must fly at low levels to better penetrate enemy defenses while increasing their own survivability.

Although flying low level will not totally eliminate the possibility of being tracked by radar, the amount of time the aircraft are exposed will be limited. For this reason, aircrews need to be able to practice low-altitude flying in a peacetime environment to be prepared in case of war.

1.1.2 SAC Low-Level Weapons Training at the Airburst Range

The primary mission of SAC is to maintain the capability to effectively deliver strategic weapons to any part of the world. A vital aspect of this mission is the ability of SAC bombers to accurately deliver bombs and cruise missiles while flying at low altitudes over diverse terrain. Thus, aircrews must develop and maintain low-level flying and bombing skills through regular training. To facilitate this, SAC requires that aircrews practice the actual release of munitions on at least half of all low-level bomber sorties. In the past, SAC has trained its aircrews primarily through simulated attacks using radar and other electronic equipment. No actual munitions were dropped. While low-level flight training using radar and simulated threat emitters is valuable, SAC aircrews also need training in actual weapons delivery to evaluate aircraft release systems and aircrew delivery tactics.

Access to the Airburst Range by way of IR-409 would provide SAC with a low-level weapons training opportunity for aircrews stationed at bases throughout the West and Southwest. Strategic bomber access to the Airburst Range would shorten mission duration for most of these aircrews and would relieve saturation of heavily used ranges such as the Utah Test and Training Range (UTTR); the Tactical Fighter Weapons Center (TFWC) range complex in Nevada; Melrose, New Mexico; Smoky Hill, Kansas; and Hardwood, Wisconsin. Currently, SAC does not own or operate any weapons ranges.

Low-altitude weapons delivery training is needed to ensure that SAC aircrews are capable of performing their assigned mission in the Emergency War Order (EWO) and tasked contingency operations.

1.2 LOCATION OF THE PROPOSED ACTION

The Airburst Range occupies 3,110 acres in the southcentral portion of the Fort Carson Military Reservation. Fort Carson, established by Congress in 1942, is a 137,381-acre complex owned and operated by the U.S. Army. The reservation lies in the Pikes Peak region of Colorado, at the foot of the Rocky Mountain Front Range, and extends from just south of Colorado Springs to about 40 miles northwest of Pueblo, Colorado. More specifically, the reservation lies within a triangle formed by U.S. Interstate 25 or the east; U.S. Highway 50 to the south; and Colorado State Highway 115 along the west. Figure 1.2-1 shows the location of Airburst Range and IR-409. Fort Carson is segmented into 56 numbered areas in which Army units, aircraft, and other weapons systems are tested and systems operators are trained and exercised. These areas are shown in Figure 1.2-2. Airburst Range is identified as "Range 123 Impact Area."

Airburst Range

The Airburst Range is operated by the 27th Tactical Fighter Wing (TFW) at the Buckley Air National Guard Base (ANGB) in Denver, Colorado. The range is used by Buckley and other bases to train aircrews in munitions delivery training. A total of 3,130 aircraft sorties were flown on the range in 1989 (ANG Range Reports 1989). These sorties were composed of 2,282 A-7, 429 F-111, 19 F-4, 8 F-16, 24 C-130, 366 Army helicopter (UH-1, AH-1, and CH-47), and 2 B-1B flight operations.

Military Training Route IR-409

IR-409 is a low-level MTR owned and scheduled by the 140 TFW at Buckley ANGB. The route was made official in October 1977. IR-409 begins approximately 10 miles north of Lamar, Colorado, proceeds southwest to the New Mexico border, turns to the northwest, and terminates at the Airburst Range. Total length of the route is 238.6 miles (207.5 nautical miles [NM][1]). IR-409 is used by Buckley and other bases to access the Airburst Range. All aircrews using Airburst Range must fly at least the last segment of IR-409. The majority of aircrews accessing the range enter IR-409 at alternate entry Point G. Consequently, the route is infrequently used from its beginning at Point A near Lamar to Point G (personal communication, Krikorian 1989). The distance from Point G to the route's termination at the Airburst Range (Point I) is approximately 44 miles (38 NM). Current use of the route, from Point G to Point I, is 2,740 sorties per year (current use of the range minus 24 C-130 and 366 Army helicopter sorties). Appendix A gives the route specifications for IR-409; detailed maps showing the route corridor are provided in Appendix B.

Special Use Airspace

All aircraft using the Airburst Range must traverse a portion of restricted area R-2601 that overlies the Fort Carson Military Reservation land area (see Figure 1.2-1). A restricted area is a controlled military use airspace that presents unusual hazards to unauthorized aircraft (see section 3.10, Airspace Management). R-2601 extends from ground level to 35,000 feet above mean sea level (MSL). Within R-2601, the Army allows Air Force aircraft to operate within a 26-square-mile portion of the southwestern corner of the installation. This area is used by most aircraft to make repeated practice runs at the range.

Some larger aircraft are unable to turn within the authorized maneuver area in R-2601 and must utilize a left-traffic racetrack pattern in order to return to the range. Currently, only F-111 aircraft require the use of this racetrack. After making a pass over the range, these aircrews make a climbing turn to the left, exit R-2601 at the base boundary, and enter the Fremont Military Operations Area (MOA). A MOA is designed to separate certain types of military training activities from other aircraft traffic (see

1. One nautical mile equals 1.15 statute miles.

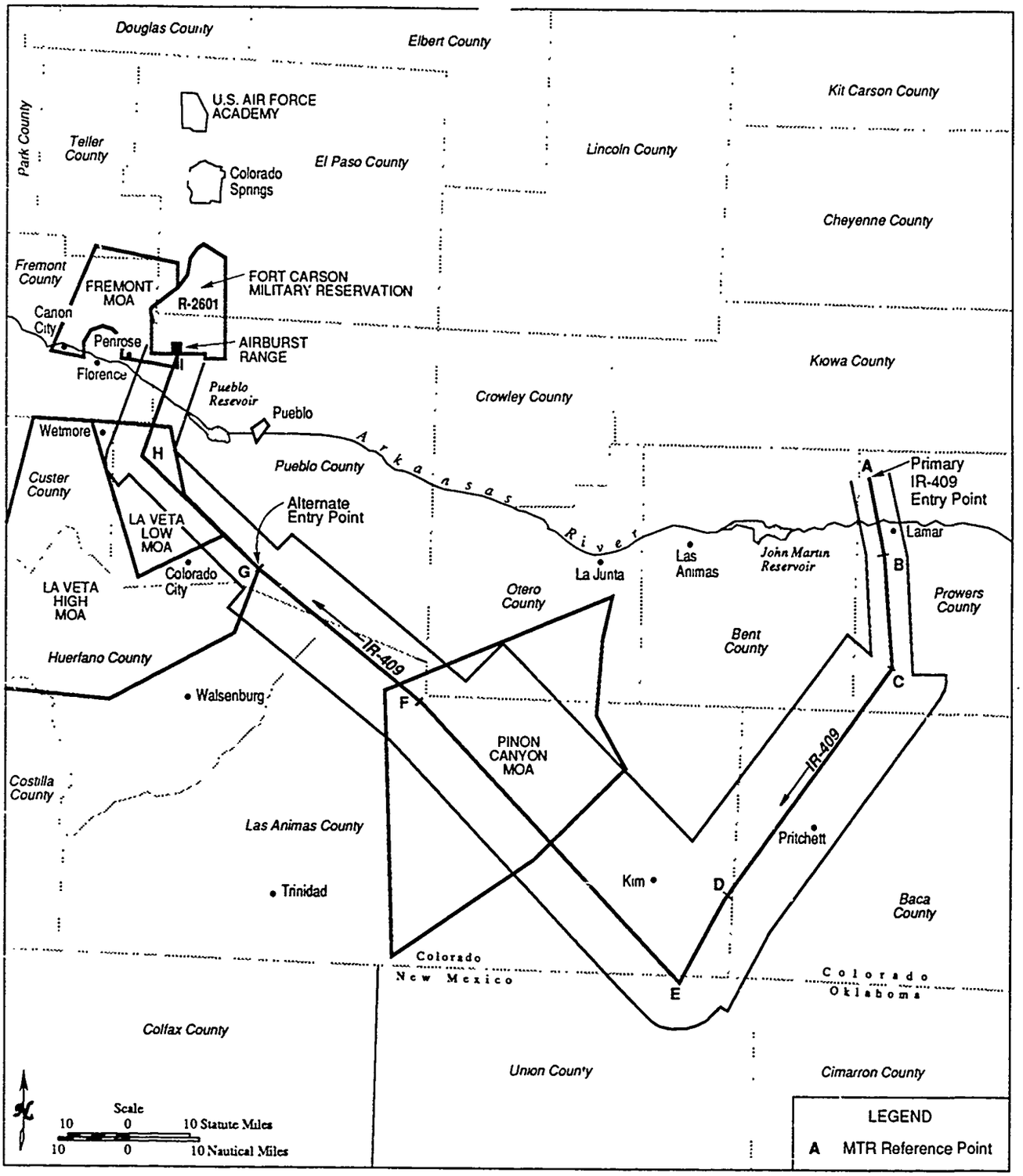


Figure 1.2-1

LOCATION OF THE AIRBURST RANGE AND IR-409

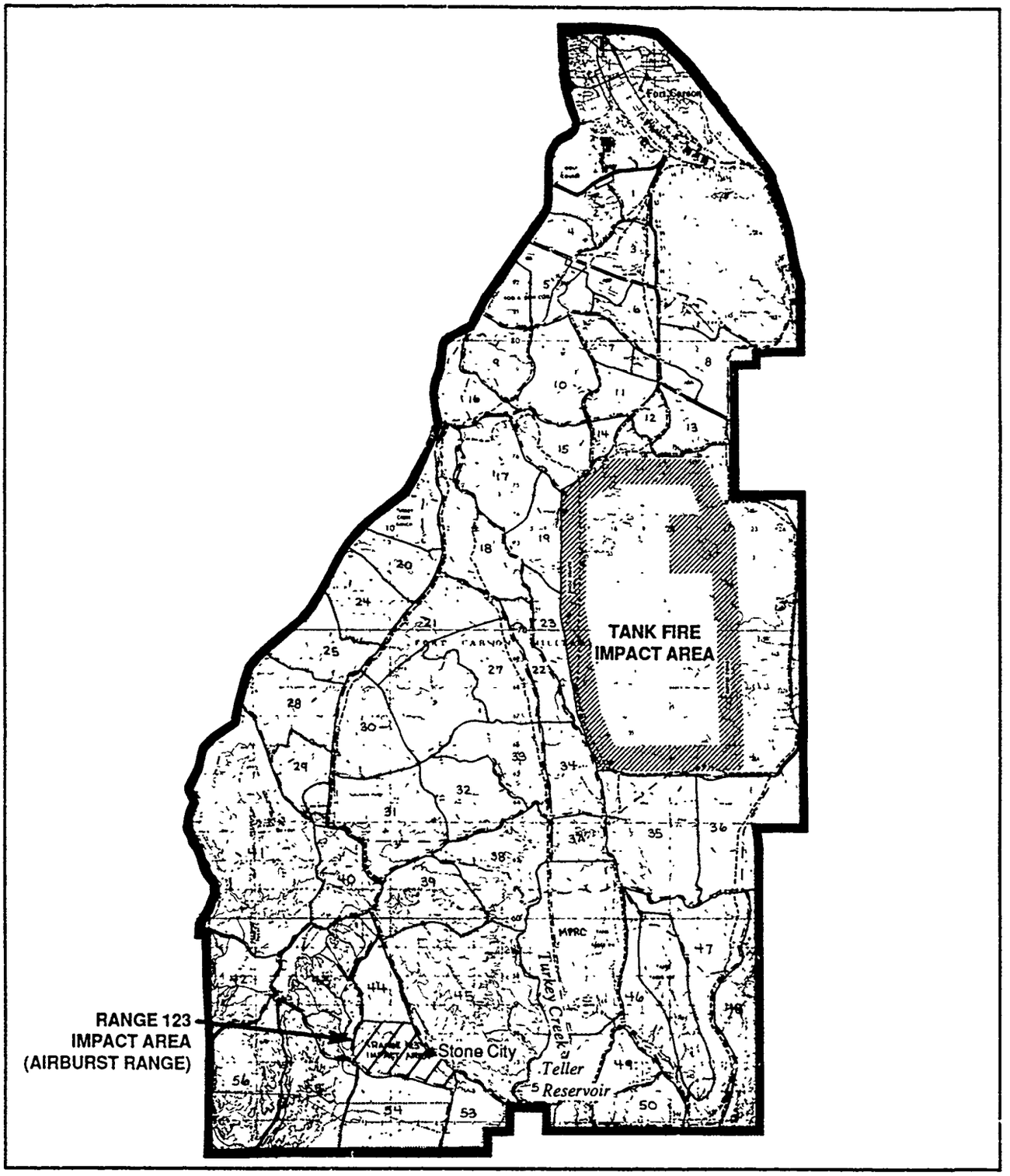


Figure 1.2-2

FORT CARSON MILITARY RESERVATION

section 3.10, Airspace Management). The Fremont MOA overlies a land area of 235 square miles in four counties: Fremont, Pueblo, Teller, and El Paso. Once in the MOA, aircrews make another left turn and exit the MOA to the south, between the Fremont County Airfield and the town of Penrose. The Fremont MOA extends from a minimum altitude of 1,500 feet AGL to a maximum altitude of 18,000 feet MSL.

Upon exiting the Fremont MOA, F-111 aircraft proceed to the La Veta Low MOA, about 10 miles to the south, where they initiate a U-turn to the left and begin the return leg back to the Airburst Range. The La Veta Low MOA extends from 1,500 feet AGL to 13,000 feet MSL. The Airburst Range racetrack is illustrated in detail in Figure 2.1-1 in section 2.0.

1.3 REGULATORY COMPLIANCE

This document was prepared in compliance with Air Force Regulation (AFR) 19-2, which implements the National Environmental Policy Act (NEPA), PL 91-190 (42 USC 4321 et seq.), and regulations (40 CFR 1500 et seq.) established by the President's Council on Environmental Quality (CEQ). The CEQ regulations require that the environmental significance of a proposed action be assessed and documented in terms of the action's context and intensity. In considering its context, the action must be analyzed for potential long- and short-term impacts on three entities: (1) society as a whole, (2) the affected region and interests, and (3) the locality.

The purpose of this EA is to determine the environmental impacts of the proposed action. If such impacts are judged to be insignificant, a finding of no significant impact (FONSI) will be issued and SAC may proceed with the proposed action. If the environmental impacts are found to be significant according to CEQ's criteria, an environmental impact statement (EIS) must be prepared before SAC and ANG may proceed with the proposed action.

The proposed action and feasible alternatives to the action are discussed in section 2.0. Section 3.0, Existing Conditions, describes the natural and human environment that would be affected. Section 4.0, Environmental Consequences, assesses potential environmental impacts from the proposed action. Section 5.0 summarizes the findings of the EA. Section 6.0 describes special flight operations that have been established to ensure that no significant environmental impacts occur.

2.0 DESCRIPTION OF THE PROPOSED ACTION AND ALTERNATIVES

2.1 PROPOSED ACTION

The proposed action is for SAC to use IR-409 and the Airburst Range for low-level flight operations and tactical weapons training. The operations would be implemented beginning in 1990 and would involve B-52 and B-1B aircraft. A description of these aircraft is provided in Appendix C. Specific operational characteristics for each aircraft include:

- *B-52 aircraft:* 1,040 sorties per year (20 sorties per week), at an average speed of 340 knots true airspeed (KTAS) (about 395 miles per hour [mph]), normal speed range of 320 to 380 KTAS, minimum altitude of 400 feet AGL. Practice weapons include BDU-48 and BDU-50. This is approximately 50 percent of SAC proposed activity.

- *B-1B aircraft:* 1,040 sorties per year (20 sorties per week), at an average speed of 550 KTAS (about 630 mph), normal speed range of 520 to 580 KTAS, minimum altitude of 400 feet AGL. Practice weapons include BDU-33, BDU-38, and BDU-50. This is approximately 50 percent of SAC proposed activity.

Each sortie would consist of an average of three passes on the Airburst Range. All aircraft would be flown at subsonic speeds at least 400 feet AGL. Approximately 80 percent of the flights would take place from 0700 to 1700 hours and 20 percent would occur from 1700 to 2200 hours. Although the Airburst Range operates six days per week, SAC aircraft would schedule sorties five days per week. Standard and minimum turn radii for B-52 and B-1B aircraft are provided below.

Aircraft	*Standard Turn Radius*	*Minimum Turn Radius*
B-52	8 NM	4 NM
B-1B	8 NM	6 NM

Figure 2.1-1 depicts the established radar racetrack pattern for F-111 aircraft currently using the Airburst Range. This pattern would be followed by all SAC B-52 aircraft. B-1B aircraft are unable to fly the F-111 radar pattern and would require a larger minimum turn radius. Consequently, B-1Bs would make one pass on the Airburst Range, climb to approximately 10,000 feet MSL, circle east of the city of Pueblo, and reenter IR-409 at alternate entry Point G for additional passes on the range. The proposed B-1B flight pattern is shown in Figure 2.1-2; a close-up of the B-1B flight track over Fort Carson is depicted in Figure 2.1-3. B-1B aircrews would contact the Denver Center Federal Aviation Administration (FAA) each time they depart restricted airspace following weapons release.

SAC would use only nonexplosive, or inert, practice munitions at the Airburst Range. All practice munitions meet range requirements for weapons safety. A complete description of general range safety procedures can be found in AFR 50-46 (*Weapons Ranges*). Diagrams of several practice munitions are provided in Appendix D. Appendix E describes drop activities of B-52s using BDU-48 practice munitions.

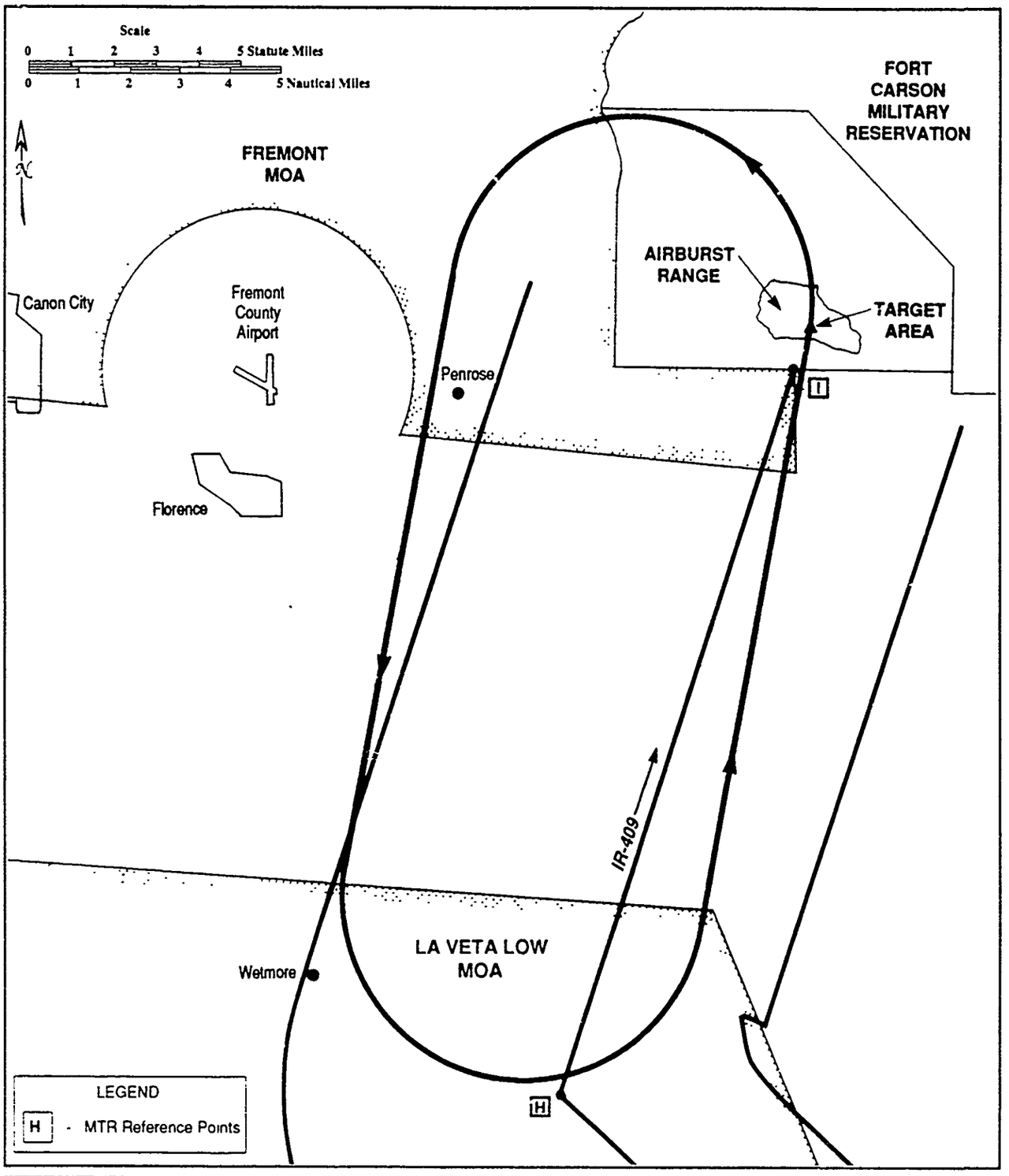


Figure 2.1-1

PROPOSED RACETRACK PATTERN FOR SAC B-52 OPERATIONS AT AIRBURST RANGE

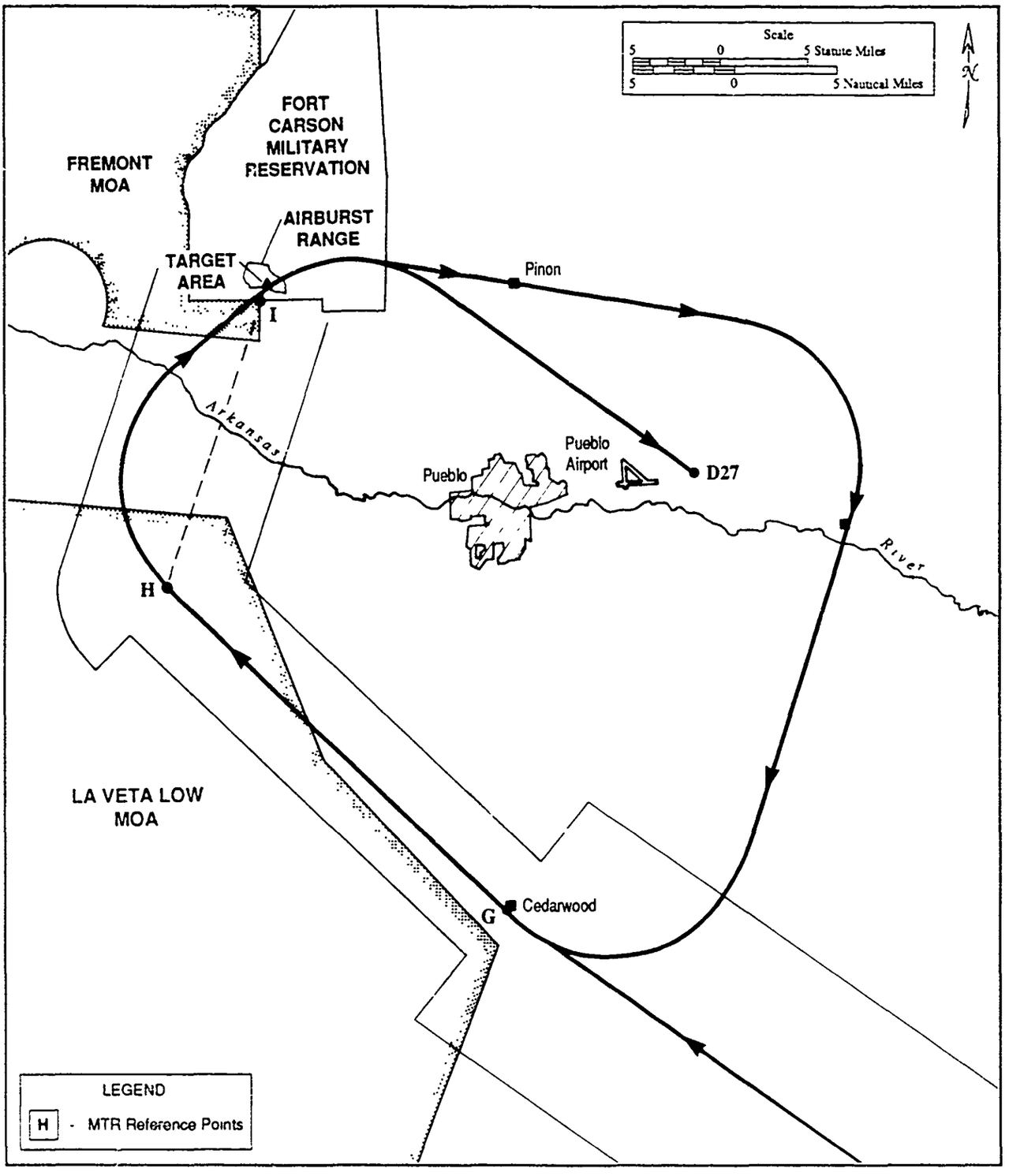


Figure 2.1-2

PROPOSED RACETRACK FOR SAC B-1B OPERATIONS AT AIRBURST RANGE

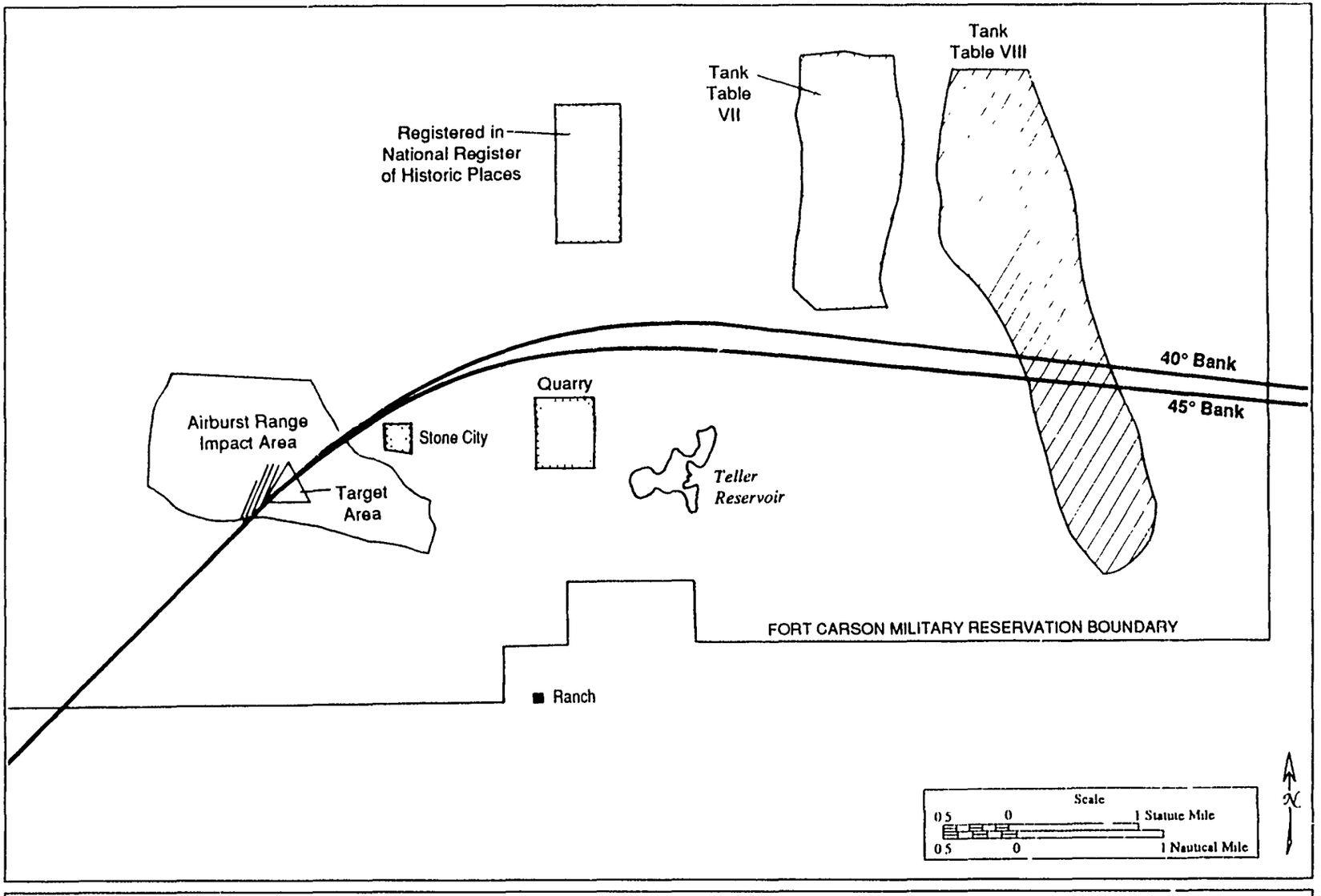


Figure 2.1-3

PROPOSED B-1B FLIGHT TRACK OVER FORT CARSON

2.1.1 SAC Operations Plan

HQ SAC units would schedule the use of the Airburst Range by direct contact with range operators at Buckley ANGB. Maintenance activities at the range or Army training activities within Fort Carson may make range times unavailable. Aircrews would only enter IR-409 and R-2601 when previously scheduled and only when cleared by the Range Control Officer (RCO) on duty.

Under the proposed action, SAC aircrews would enter IR-409 at its origin near Lamar, Colorado and proceed to its termination at Airburst Range. SAC aircrews would fly IR-409 within the confines of the route as published in the Department of Defense (DOD) Flight Information Publication (FLIP) AP/1B and in compliance with any direction, restrictions, or guidance provided by the route owner, Buckley ANGB.

All SAC aircraft would enter IR-409 at Point A at 10,000 feet MSL (approximately 6,000 feet AGL) and maintain this altitude to Point B. At Point B, the aircraft would descend to not lower than 400 feet AGL, then climb again to 1,000 feet AGL at Point G. Aircraft would maintain an altitude of 1,000 feet AGL from Point G to Highway 50 (just south of the range boundary). After crossing Highway 50, the aircraft would descend to not lower than 400 feet AGL to overfly the Airburst Range.

Once in R-2601, SAC aircrews would perform weapons delivery training at the Airburst Range. B-52 aircraft would then make a left turn and enter the range's counter-clockwise (left-traffic) racetrack pattern for subsequent passes on the range. B-1B aircraft would make a right turn, circling to the east, then reenter IR-409 at Point G for subsequent passes on the range. On completion of delivery training, all SAC aircrews would exit R-2601 to the north by climbing to 18,000 feet MSL (or as previously assigned by the FAA Air Route Traffic Control Center [ARTCC]) and would contact the Air Traffic Control Center in Denver.

All SAC training exercises would conform to the existing operational requirements for the range, as established by Buckley. While on Airburst Range, SAC aircrews would do the following:

1. Proceed through the range, drop a practice bomb or complete a dry run, exit the range, and depart the area.

2. *For B-52s*: Proceed through the range, drop a practice bomb or complete a dry run, enter a left-traffic pattern through R-2601 and into the Fremont MOA, exit the Fremont MOA and reenter the IR-409 corridor at approximately Point H to set up for another run across the range. This pattern could be repeated several times as long as it has been previously scheduled with the range. SAC aircraft would typically make three passes on the range per sortie, then depart the area.

   For B-1Bs: Proceed through the range, drop a practice bomb or complete a dry run, turn right over Fort Carson while climbing to 10,000 feet MSL, circle to the east of Pueblo, and reenter the IR-409 corridor at Point G to set up for another run across the range. This pattern could be repeated several times as long as it has been previously scheduled with the range and ARTCC. SAC aircraft would typically make three passes on the range per sortie, then depart the area.

2.1.2 SAC Flight Restrictions and Special Operating Procedures

It is SAC and ANG policy to implement flight restrictions and special operating procedures where necessary to avoid or minimize environmental impacts. Aircrews would follow the special operating procedures identified below to minimize any potential impacts.

- o Maintain lateral separation from any identified sensitive noise receptors, particularly the town of Penrose and the ranch located south of the Fort Carson boundary.

- o Inform Denver Center ATC when flying outside the designated restricted area (R-2601) or Fremont MOA. FAA regulations require that all aircraft contact the nearest ATC center upon exiting military airspace and entering civilian airspace.

- o Follow the current authorized radio-monitoring procedures contained in the FLIP AP/1B while transiting the Pinon Canyon MOA. In addition, all SAC aircrews should be briefed as to the scheduled activity in the MOA.

- o Avoid direct overflight of bighorn sheep reintroduction areas or raise the minimum altitude to 1,500 feet AGL above these areas.

2.2 ALTERNATIVES CONSIDERED BUT NOT CARRIED FORWARD

2.2.1 Conventional Enhanced Released Training (CERT) Program

Because of limited range availability and operational saturation on available ranges, SAC is instituting a new training program, CERT, for B-52 aircrews. The CERT program involves the release of inert, nonexplosive, 10-pound training devices over a designated drop zone on a SAC main operating base. A 60-day test was conducted at Minot and Eaker AFBs to assess the feasibility of the program. With the successful completion of the environmental impact analysis process (EIAP), SAC has expanded the program to four locations: Minot, Eaker, Loring, and Andersen AFBs. CERT would not be implemented at the Airburst Range or any other ANG facility.

CERT will help alleviate saturation of the existing ranges that SAC is attempting to access. However, CERT only partially fulfills SAC's weapons delivery requirements. Only one type of aircraft (B-52) and munitions (BDU-48) are used in the program. Furthermore, CERT will be restricted to the four bases mentioned above. SAC's mission to support the Air Force's conventional role also requires training for B-1B and FB-111 aircrews using a variety of munitions at weapons ranges located throughout the United States. Consequently, this alternative is not carried forward in this analysis. The impacts of CERT have been evaluated in separate EAs prepared by HQ SAC/DEV.

2.2.2 Development of a SAC Weapons Range

Currently, SAC owns no ranges and is considering the development of a new weapons range within the Strategic Training Range Complex (STRC). The STRC is located in the northcentral region of the United States, particularly South Dakota, North Dakota, Wyoming, and Montana. A study to locate feasible sites has been prepared. SAC is considering the STRC because of its proximity to the complex of low-level routes (about 17 existing routes), the Strategic Warfare Center, the Strategic Training Range (STR) sites used as radar sites for tracking aircraft, and the numerous portable mini-mute radar sites throughout those states. Ellsworth AFB, South Dakota is also near the STRC.

The development of the SAC range is a viable but long-term alternative that will require approximately three to five years to accomplish. The proposed SAC range would alleviate the overuse of existing ranges and would save considerable flying time and fuel costs for several SAC units. However, for SAC units in the West and Southwest, this alternative would not result in reduced flying time or fuel cost savings. For these SAC units, flights to and from the proposed SAC range would require several more hours of flying time than would the proposed training operations at the Airburst Range. Some southcentral-based aircraft could fly to and operate from Ellsworth AFB, South Dakota. However, due to limited ramp space and heavy use by all SAC units, Ellsworth AFB could not accommodate more than one aircraft per week from southcentral SAC bases. Due to the long-term nature of the SAC

range development program and SAC's need for access into existing, accessible ranges, this alternative is not currently considered viable.

2.2.3 Use of Canadian Ranges

Use of Canadian ranges has been considered as a potential alternative. However, use of these ranges involves dealing with the sovereign airspace and properties of another country. The U.S. military uses Canadian assets only by invitation. Although SAC has access to two Canadian ranges, use is on a very limited, noninterference basis. Long-term, expanded use is under consideration by the National Defense Headquarters in Ottawa. However, terms of an agreement allowing SAC operations have not been defined. Final disposition on the proposal may not come for some time and may not favor expanded SAC use.

2.2.4 Utilization of Other Existing Ranges in the United States

The Airburst Range is being considered for SAC low-altitude weapons delivery training because of its proximity to bases with SAC bombers. Other ANG ranges, such as the Hardwood Range in Wisconsin and the Smoky Hill Range in Kansas, are also being used by SAC. However, these ranges are already heavily used by ANG aircraft; limiting SAC operations to these ranges would result in further saturation of airspace that is already congested.

The following ranges were evaluated by SAC but are currently not being considered for utilization due to operational constraints and restrictions by range owners:

- *Navy ranges*: Admiralty Bay, Washington; Navy Fore, North Carolina; Vieques, Puerto Rico; and Palmetto Point, North Carolina.
- *Army ranges*: Fort Hood, Texas.
- *Air Force ranges*: Dare County, North Carolina; Grand Bay, Georgia; and Oscura/Red Rio, New Mexico.
- *Air National Guard ranges*: Camp Grayling, Michigan; Jefferson Proving Grounds, Indiana; Townsend, Georgia; Fort Indiantown Gap, Pennsylvania; Warren Grove, New Jersey; and Atterbury, Indiana.

Operational considerations precluding SAC use of these ranges include lack of airspace, scheduling conflicts, capacity constraints, and availability of low-level MTRs leading to the ranges. Consequently, these ranges are not considered feasible alternatives and are not carried forward in the analysis.

2.2.5 Route Alternatives

1. *Build a new instrument route (IR) or visual route (VR).* Airburst Range can only be approached from the south. IR-409 already accesses the range from this direction. A new low-level route would only duplicate what already exists. Consequently, this is not a feasible alternative.

2. *Fly visual flight rules (VFR) with no route.* Aircrews would not be able to fly a low-level route nor obtain low-level training (prior to entering the range) by flying VFR rather than on a published route. In addition, aircraft would not be able to accelerate above 250 knots indicated airspeed (KIAS) until on the range. This is less than typical combat airspeed and would not provide realistic training. Consequently, this is not a feasible alternative.

2.3 NO-ACTION ALTERNATIVE

The no-action alternative would not allow SAC to fulfill its mission requirements. Increases in fuel consumption and flying time would occur if more distant ranges (e.g., the Tactical Fighter Weapons Center range complex in Nevada) had to be accessed. If no action is taken, the quality of training for SAC aircrews would not be upgraded. This alternative is not considered further.

3.0 EXISTING CONDITIONS

This section describes the relevant environmental and human resources present in the vicinity of the Airburst Range and IR-409. The following descriptions are presented in the detail necessary to support the impact analyses presented in section 4.0. The topics discussed are earth and water resources, air quality, biological resources, visual resources, land use, cultural resources, noise, socioeconomics, airspace, and air safety.

3.1 EARTH RESOURCES

Airburst Range, within the Fort Carson Military Reservation, lies on the boundary between the Great Plains and the southern Rocky Mountain physiographic provinces. The western part of Fort Carson is characterized by deep canyons, hills, and hogbacks of sedimentary rocks uplifted with the Front Range of the Rocky Mountains (USGS 1984). The topography flattens out further to the east and most of eastern Colorado is a gently rolling plain with shallow depressions. Steep-walled canyons and mesa tops occur in areas historically cut by larger rivers. Elevations on the Airburst Range vary from 5,448 feet MSL to 5,594 feet MSL (Defense Mapping Agency 1983). Elevations beneath the IR-409 route corridor range from approximately 3,800 feet MSL near its origin at Lamar to 6,500 feet MSL near Point H.

The Fort Carson Military Reservation is underlain by a continuous bedrock complex. Covering this bedrock is a layer of sedimentary rocks several thousand feet deep. In the vicinity of the Airburst Range, rock units near the surface are predominantly shale, limestone, and sandstone. Soils throughout the area are alkaline.

Surface soils on Fort Carson were formed from alluvium washed down from the Rocky Mountains and vary widely in composition and texture. In the vicinity of the Airburst Range, soils consist of fine clayey sands and sandy clays, along with scattered areas of fine gravel. These soils are susceptible to erosion by both wind and water (rainfall and melting snow). Fort Carson currently treats the target areas for erosion control. Soil sterilant is applied to graded surfaces, and runs are filled with sand from Red Creek (written communication, LaBlonde 1982).

The climate in the project area is semiarid, with moderate temperatures, low precipitation, and low humidity. The mean maximum temperature is 43.6°F in January and 88.2°F in July; the mean minimum temperature is 14.9°F in January and 58.8°F in July. Prevailing winds along the Front Range are from the north, with an average speed of 10 mph. West-to-east Chinook winds in the fall, winter, and spring can reach speeds of 70 mph or more.

Precipitation occurs mostly in the form of localized thunderstorms in the summer months. Average annual precipitation on Fort Carson is 12 to 15 inches, with approximately 80 percent falling between April and September. Average annual snowfall in th region is 36 inches per year. Thunderstorms, which occur in the region about 50.5 days per year, are generally accompanied by heavy showers, severe gusty winds, frequent thunder and lightning, and occasional hail (U.S. Army 1979).

No geologic hazards, including geothermal hot springs, landslides, or potentially active faults, are known to exist in the vicinity of the Airburst Range. However, large landslides have occurred primarily in the western portions of Fort Carson where topography is moderate to steep (SDIO 1987).

Soil erosion by water has been identified as the most serious land conservation problem at Fort Carson. Extensive livestock grazing prior to 1942 and military training activities since have destroyed much of the original plant cover and left soils vulnerable to erosion and runoff. Erosion control dams and water diversion channels have been constructed in areas of the installation where soil erosion is a problem in order to reduce the sediment loading in downstream waters (U.S. Army 1986).

3.2 WATER RESOURCES

3.2.1 Surface Water

The major body of surface water in southern Colorado is the Arkansas River. The Arkansas River originates near the Continental Divide of the Rocky Mountains and runs eastward approximately 8 to 10 miles south of the Airburst Range. IR-409 overflies the river between points A and B, and again between points H and I. All streams in the vicinity of the range and route drain into the Arkansas River.

Surface water is generally scarce in Colorado east of the Rockies. Virtually all of the sparse precipitation which falls on the plain immediately evaporates or is taken up by desert plants. Following a heavy thunderstorm, runoff water temporarily fills the numerous intermittent streambeds. Runoff water may also collect in the desert playas, but these usually dry up again within a few days.

In addition to portions of the Arkansas River, surface water beneath the IR-409 route corridor includes several smaller rivers and numerous small permanent and intermittent streams. Many of these streams are dammed to create small reservoirs used primarily for irrigation and livestock. The largest reservoir beneath the route corridor is Two Buttes Reservoir, south of Point C (refer to Figure 3.5-1).

Streamflow on Fort Carson consists primarily of precipitation runoff and some groundwater seepage. While there are several small springs in the general area, there are very few springs on Fort Carson. Outside the installation, spring water supports desert wildlife and is used to water livestock during part of the year. All streams entering and originating on Fort Carson are ephemeral, or intermittent. During most of the year, no flow occurs in most reaches of these streams. Continuous flow in Turkey Creek downstream from Teller Reservoir was observed to result from groundwater seepage near the southeast abutment of the reservoir (USGS 1984). An unnamed intermittent stream traverses much of the Airburst Range, and continues southward toward the Arkansas River.

There are six reservoirs of varying capacities totaling 250 surface acres located throughout Fort Carson (140th TFW 1977b). Surface water is diverted from Little Fountain, Little Turkey, Red, Rock, and Turkey creeks for direct use in irrigation and for storage in reservoirs. Reservoirs on Fort Carson are used for flood control, irrigation, domestic water supplies, construction, fire control, maneuver training for U.S. Army units, recreation, and wildlife-habitat management (USGS 1984). Teller Reservoir, an impoundment on lower Turkey Creek, lies approximately 3 miles east of Airburst Range. Teller Reservoir has a decreed capacity of 12,866 acre-feet; however, the reservoir is partly filled with sediment and its capacity was measured in 1980 to be slightly more than 1,780 acre-feet (USGS 1984).

The quality of surface water in streams entering Fort Carson is suitable for irrigation and generally is suitable for drinking with treatment for biological contaminants (primarily fecal coliform). The quality of water in streams deteriorates eastward across Fort Carson. Concentrations of dissolved solids from 49 to 292 milligrams per liter observed in streamflow from western and northern portions of Fort Carson increase to 121 to 1,470 mg/l downstream at the eastern and southern boundaries of the installation (USGS 1984).

3.2.2 Groundwater

Groundwater in the vicinity of the range is contained in both alluvial and bedrock aquifers. Alluvial aquifers are near the ground surface and are recharged by precipitation, runoff of irrigation water, and percolation of water from streambeds. The highest-yielding alluvial aquifer on Fort Carson occurs along Little Fountain and Rock creeks in the northeastern part of the installation. Here, the alluvium is about 60 feet thick and well yields greater than 100 gallons per minute (gpm) have been obtained (USGS 1984).

The Dakota-Purgatoire bedrock aquifer underlies most of Fort Carson. This aquifer is exposed at the surface in the southwestern part of Fort Carson, dips steeply to the south and east, and is 1,500 to 2,000 feet below the land surface along the eastern boundary of Fort Carson. Well yields greater than 100 gpm have been obtained from this aquifer in the southern part of Fort Carson (USGS 1984).

Groundwater moves in an easterly direction across Fort Carson and then shifts to a southeasterly flow Because of the widespread occurrence of clayey soils, groundwater flow through the installation is generally slow (U.S. Army 1979). Wells located throughout Fort Carson provide water for domestic uses, military training, recreation, irrigation, fire control, dust suppression, construction, and wildlife habitat (USGS 1984).

Water from the alluvial aquifers along the western side of Fort Carson is suitable for human consumption and other uses. However, water from the alluvial aquifer along Little Fountain and Rock creeks in the eastern part of Fort Carson contains fluoride in concentrations exceeding drinking-water standards. Water from the Dakota-Purgatoire aquifer is very hard, with total dissolved solids ranging between 162 and 725 milligrams per liter (mg/l) (U.S. Army 1979). In addition, the water contains concentrations of naturally occurring radiochemical materials which exceed drinking-water standards (USGS 1984).

3.3 AIR QUALITY

Air quality in a given location is described by the concentrations of various pollutants in the atmosphere expressed in units of parts per million (ppm) or micrograms per cubic meter ($\mu g/m^3$). The significance of a pollutant concentration is usually determined by comparison with federal and/or state air quality standards. These standards represent allowable pollutant levels that protect public health and welfare with a reasonable margin of safety. Federal standards are established by the U.S. Environmental Protection Agency (EPA) and termed the National Ambient Air Quality Standards (NAAQS). The NAAQS are defined as the maximum acceptable ground-level concentrations from criteria pollutants that may be equaled but not exceeded. These standards include concentrations for ozone (O_3), carbon monoxide (CO), nitrogen dioxide (NO_2), sulfur dioxide (SO_2), particulate matter less than 10 microns in diameter (PM_{10}), and lead (Pb). The Colorado Department of Health has adopted standards equivalent to the NAAQS to regulate air pollutant levels. The NAAQS are shown in Table 3.3-1.

Air quality in the project area is generally very good due to the rural setting and lack of emission sources. With the exception of El Paso and Fremont Counties, the counties in Colorado and New Mexico that could be affected by the proposed action (El Paso, Fremont, Pueblo, Huerfano, Las Animas, Otero, Baca, Bent, and Prowers in Colorado; Union in New Mexico) are designated as either in attainment or unclassified for all NAAQS. El Paso County is designated as a nonattainment area for CO due primarily to mobile and stationary source emissions in the area of Colorado Springs. Fremont County has been designated as a nonattainment area for particulate matter, including PM_{10}, in the area of Canon City. A nonattainment designation means that a primary NAAQS has been exceeded more than three discontinuous times in three years in a given area. Areas are designated as unclassified when there is insufficient information for the EPA to determine attainment status. Unclassified areas are often rural in nature and generally accepted as in attainment of the NAAQS.

A number of control strategies have been adopted to reduce levels of CO in Colorado Springs. The Pikes Peak Area Council of Governments is currently revising the Pikes Peak Region's State Implementation Plan (SIP) for CO. Efforts include formulation of a workplan for the revised SIP and a monitoring plan to accumulate a comprehensive CO database. Likewise, officials of Canon City have adopted control plans to reduce the amount of particulate matter released as the result of street sanding after winter storms. Street sanding is estimated to account for 70 percent of the particulate matter emissions in Fremont County (CAQCC 1989). Aircraft are not considered as major contributors to either of these nonattainment problem areas and control strategies for aircraft are not

Table 3.3-1

NATIONAL AMBIENT AIR QUALITY STANDARDS

Pollutant	*Averaging Time*	NATIONAL STANDARDS[a] *Primary*[b,c]	*Secondary*[b,d]
Ozone	1-hour	0.12 ppm (235 ug/m^3)	Same as primary standard
Carbon Monoxide	8-hour	9 ppm (10 mg/m^3)	Same as primary standard
	1-hour	35 ppm (40 ug/m^3)	Same as primary standard
Nitrogen Dioxide	Annual	100 ug/m^3 (0.05 ppm)	Same as primary standard
Sulfur Dioxide	Annual	80 ug/m^3 (0.03 ppm)	None
	24-hour	365 ug/m^3 (0.14 ppm)	None
	3-hour	None	1,300 ug/m^3 (0.5 ppm)
PM_{10}[e]	Annual	50 ug/m^3	None
	24-hour	150 ug/m^3	None
Lead	Quarterly	1.5 ug/m^3	Same as primary standard

Notes:

a. National standards, other than those based on annual averages or annual geometric means, are not to be exceeded more than once per year.

b. Concentration expressed first in units in which standard was promulgated. Equivalent units given in parentheses are based upon a reference temperature of 25°C and a reference pressure of 760 mm of Hg (1,013.2 millibars); ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas.

c. National Primary Standards express the level of air quality necessary to protect the public health from any known or anticipated adverse effects of a pollutant, allowing for a margin of safety to protect sensitive members of the population.

d. National Secondary Standards express the level of air quality necessary to protect the public welfare by preventing injury to agricultural crops and livestock, deterioration of materials and property, and adverse impacts on the environment.

e. Particulate matter less than 10 microns in diameter.

included in either of the control plans. Aircraft operations associated with the proposed action are therefore not required to show consistency with the plans. Additionally, mobile sources such as military aircraft are presently exempt from regulatory requirements. However, maintenance of the existing air quality, especially the consistently high visibility in the southern Colorado area, is a major concern. A potential impact could result from excessive aircraft emissions that degrade the air quality or reduce visibility. Presently, air quality in the range and training route areas is quite good, and reductions in visibility are caused primarily by local generation of fugitive dust by winds that are frequently of high-velocity.

Current levels of emissions associated with aircraft operations at the Airburst Range, in the racetrack areas, and along IR-409 are provided in Table 3.3-2 for the year 1989. Factors used to estimate the jet and transport plane emissions (other than SO_2) were obtained from the *Aircraft Engine Emissions Estimator* (Seitchek 1985). Jet and transport plane emission factors for SO_2 were estimated in accordance with AP-42, *Compilation of Air Pollutant Emission Factors, Volume II* (EPA 1985), i.e., the fuel use rate was multiplied by 0.01 percent weight content of sulfur in the fuel to obtain the SO_2 emission rate. Emission factors for helicopters were obtained directly from AP-42. A 90- to 95-percent engine thrust setting (military) was used to estimate all jet and transport plane emissions, and helicopter cruise emissions were estimated as equal to emissions during climb-out. Total aircraft daily emissions for 1989 amounted to 0.15 tons of CO, 0.01 tons of total hydrocarbons (THC), 0.70 tons of nitrogen oxides (NO_x), 0.05 tons of SO_2, and 0.03 tons of particulate matter (PM). Annual emissions for 1989 were 14.2 tons of CO, 1.3 tons of THC, 148.0 tons of NO_x, 7.9 tons of SO_2, and 4.9 tons of PM.

3.4 BIOLOGICAL RESOURCES

3.4.1 Vegetation

Vegetation in the study region consists of five major plant communities: plains grassland (also called short-grass prairie); pinyon-juniper woodland; riparian woodland; cultivated areas; and, at mid-to-upper elevations, pine-douglas fir forest (Kuchler 1964). These communities are described below. In addition to these broad vegetation types, the U.S. Soil Conservation Service (SCS) has identified many range sites in the area. Range sites are defined by the SCS as distinctive types of rangeland differing from other areas in their ability to produce a characteristic plant community.

Plains grassland is a dense grassland consisting of short grasses interspersed with some taller grasses. It is the most abundant community type in the vicinity of the range (Andersen and Rongstad 1983) and route, and generally occurs below 6,000 feet MSL. It contains many localized plant communities, the occurrence of which depend primarily on soil types, elevation, climate, topographic features, and history of past uses such as grazing The most abundant species are blue grama (*Bouteloua gracilis*), buffalograss (*Buchloe dactyloides*), and galleta (*Hilaria jamesii*), but occasionally prickly pear (*Opuntia* spp.) and yucca (*Yucca* sp.) are present. These grasslands are in fair condition throughout most of the study area, but can be in poor condition near livestock watering areas (U.S. Army Corps of Engineers 1980). Parts of the Comanche National Grassland, which consists primarily of plains grassland, underlie IR-409. Much of this area is grazed by domestic livestock.

Pinyon-juniper woodlands occur from 6,300 to 7,500 feet MSL. In the vicinity of the range and route, the most abundant species are pinyon pine (*Pinus edulis*), juniper (*Juniperus monosperma*), and many of the same species that occur in grasslands, such as blue grama and needle and thread (*Stipa* sp.). Mountain mahogany (*Cercocarpus montanus*) and other shrubs are occasionally present (Woodin and Lindsey 1954).

Riparian vegetation is present along streams and rivers and near seeps, pools, and reservoirs. The Arkansas, Cucharas, and Purgatoire Rivers and Fountain Creek provide the majority of riparian habitat in the study area. Cottonwood (*Populus sargentii*), willow (*Salix* spp.), and salt cedar (*Tamarix*

Table 3.3-2

AIRCRAFT EMISSIONS ASSOCIATED WITH CURRENT USE OF THE AIRBURST RANGE AND RACETRACK AND IR-409

	----- POUNDS OF EMISSIONS/SORTIE -----				
Aircraft	*CO*	*THC*	*NO_x*	*SO_2*	*PM*
Airburst Range and Racetrack					
A-7	7.6	0.8	88.4	4.2	2.8
C-130	8.3	1.6	36.5	3.9	2.0
F-4E/G	51.2	1.0	104.1	9.8	9.1
F-16	4.7	0.5	139.3	5.2	1.8
F-111	4.9	0.1	73.8	6.2	2.5
B-1B	151.7	8.0	45.9	20.0	0.4
AH-1	5.0	0.7	6.4	0.9	0.8
CH-47	14.0	0.2	18.6	1.8	1.6
UH-1	2.5	0.4	3.2	0.5	0.4
UH-60	5.0	0.7	6.4	0.9	0.8
IR-409					
A-7 (A-I)	7.0	0.7	81.7	3.9	2.6
A-7 (G-I)	1.3	0.1	14.9	0.7	0.5
F-4E/G	8.1	0.2	16.5	1.6	1.4
F-16	0.7	0.1	21.2	0.8	0.3
F-111	0.7	0.0	11.2	0.9	0.4
B-1B	116.9	6.2	35.4	15.4	0.3

	---------- TONS OF EMISSIONS ----------				
	CO	*THC*	*NO_x*	*SO_2*	*PM*
Airburst Range and Racetrack					
Current Daily Emissior	0.14	0.01	0.59	0.04	0.03
Current Annual Emissions	11.65	1.03	120.26	6.46	3.99
IR-409					
Current Daily Emissions	0.01	0.00	0.11	0.01	0.00
Current Annual Emissions	2.51	0.24	27.73	1.42	0.89
TOTAL CURRENT DAILY EMISSIONS	0.15	0.01	0.70	0.05	0.03
TOTAL CURRENT ANNUAL EMISSIONS	14.16	1.26	148.00	7.89	4.88

chinensis) are the most abundant trees in these areas, providing cover for birds such as warblers and kingbirds (Lindauer 1983).

Pasture lands and cultivated areas occur in the easternmost portion of the study area below IR-409. Principal crops include small grain, corn, and sugar beets, among others. Much of this area was plowed in the early 1900s, and became part of the Dust Bowl after prolonged drought in the 1930s. Some of this land has been rehabilitated and is currently grazed by domestic livestock.

A small amount of ponderosa pine (*Pinus ponderosa*) and Douglas fir (*Pseudotsuga menziesii*) forest is present at the highest elevations in the westernmost portion of the study area near Point H of IR-409. Other components of this forest vegetation type include Rocky Mountain maple (*Acer glabrum*) and mountain alder (*Alnus tenuifolia*).

3.4.2 Wildlife

Although a wide variety of wildlife species occur on the Airburst Range and beneath IR-409, only those likely to be affected by low-flying aircraft are discussed in detail here. For this analysis, available data on wildlife occurring in the study area were obtained from the Colorado Division of Wildlife (CDOW).

Mammals in the study area include ground squirrels, desert cottontail, jackrabbit, black-tailed prairie dogs, beaver, coyote, fox, mountain lion, black bear, muskrat, and bobcat, in addition to game animals such as scaled quail, Rocky Mountain bighorn sheep, mule deer, white-tailed deer, elk, and American pronghorn (Bissell 1978). Primary habitats of importance to wildlife are pinyon-juniper woodlands, riparian areas of canyon bottoms and streams, canyon walls, and grasslands.

Bighorn sheep have not been observed on Fort Carson, but they have been observed in the mountains west of Fort Carson (personal communication, D. Lovell 1989; S. Emmons 1989). In the late 1970s and early 1980s, bighorn were reintroduced to three areas beneath IR-409 in Las Animas County: (1) canyons and cliffs along the Purgatoire and Chacuaco Rivers and at their confluence; (2) West Carrizo Creek on Black Mesa; and (3) Apishapa Canyon (CDOW 1990) (see Figure 3.4-1). All three of these areas include production areas, which are areas occupied by pregnant females in May and June. Two populations (Apishapa and West Carrizo Ceek) are currently being hunted (personal communication, M. Elkins 1990). Summer and winter range for bighorn is also found in the Wet Mountains, about 15 miles west of a portion of IR-409 in Huerfano and Pueblo counties (CDOW 1990). Bighorn rut in November and December and lambs are born in May and June (Schnurr and Ellenberger 1984).

Mule deer are known to occur throughout the project area, but are generally restricted to areas providing cover and forage, such as in foothill woodlands and along riparian corridors. Pronghorn are found in the grasslands of the foothills and plains throughout the project area (CDOW 1990; U.S. Army Corps of Engineers 1980; U.S. Army 1979). At least three winter concentration areas are located in the project area: beneath IR-409 near Tobe in Las Animas County, immediately south of the Airburst Range in Pueblo County, and east of Cedarwood in Pueblo County (CDOW 1990). About 40 prairie dog towns are located on the southern end of Fort Carson (personal communication, S. Emmons 1989).

Birds occurring on the Airburst Range and in the vicinity of IR-409 include raptors, waterfowl (in wetland areas), some large wading birds such as sandhill cranes, wild turkeys, game birds such as scaled quail, and a variety of passerine species. The abundance of rodents and rabbits in grasslands provides an ample forage base for raptors, including red-tailed hawk, ferruginous hawk, rough-legged hawk (in winter), golden eagle, northern harrier, turkey vulture, prairie falcon, and Swainson's hawk, in addition to owls such as the common barn owl, great horned owl, burrowing owl, and others (Andersen and Rongstad 1983). Many raptors no longer nest in the immediate vicinity of the Airburst Range, but they do nest in other areas of Fort Carson (e.g., near Teller Reservoir) (personal communication, S. Emmons 1989; Andersen and Rongstad 1983). Golden eagles occur throughout the project area.

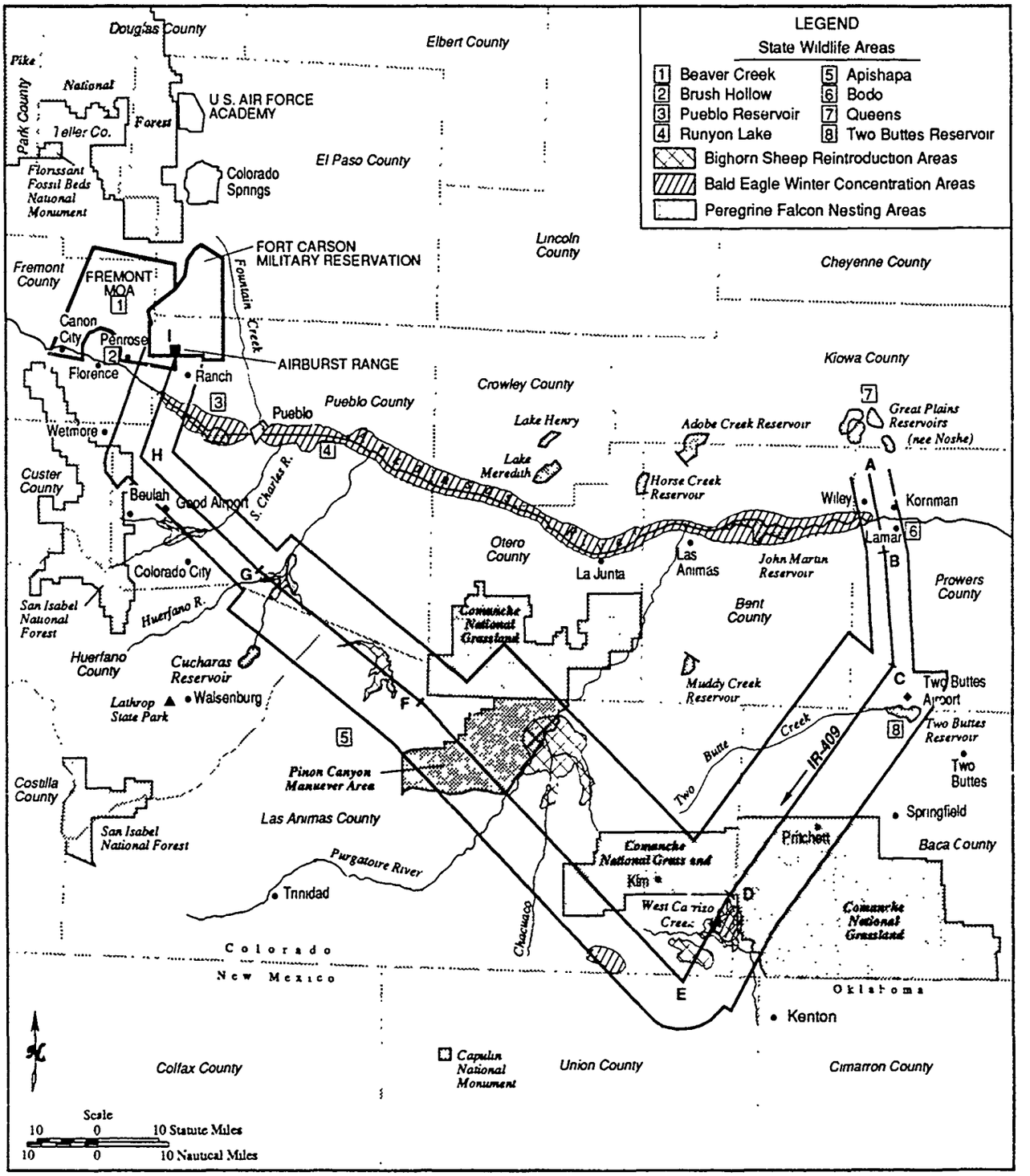


Figure 3.4-1

SENSITIVE BIOLOGICAL RESOURCES IN THE VICINITY OF THE AIRBURST RANGE AND IR-409

Active golden eagle nests have been documented in at least four locations beneath IR-409, and many additional active nests are present in the Spanish Peaks area outside the study area (CDOW 1990). Both golden eagles and prairie falcons concentrate along a 10-mile stretch of the Huerfano river south of Cedarwood. Two prairie falcons nests are located beneath the IR-409 corridor in the vicinity of the St. Charles river in Pueblo County (CDOW 1990). Swainson's hawks, which nest later than other raptors (Andersen 1989), are also fairly common breeders and migrants throughout the project area. Many raptors, especially ferruginous and red-tailed hawks, concentrate in the vicinity of the Army's Pinon Canyon Maneuver Site, part of which underlies IR-409. Other sensitive raptor species are discussed in the Threatened and Endangered Species section. While no specific raptor migration routes have been identified in the area, raptors are believed to migrate through the area during the fall season in a very diffuse pattern (personal communication, M. Carter 1989).

Although IR-409 is situated to the west of the main corridor of the Central Flyway, waterfowl, primarily ducks and geese, migrate through the area in moderately large numbers (Bellrose 1980). During winter, waterfowl concentrate along the Arkansas River from the Pueblo area east to the Colorado/Kansas border (Hopper 1968), and along Fountain Creek near Pueblo. IR-409 passes over waterfowl concentration areas only near the town of Lamar, where the minimum AGL for aircraft is 6,000 feet. The Two Buttes Reservoir State Wildlife Area (SWA), which is about 5 miles east of the IR-409 centerline in northern Baca county, contains waterfowl habitat and, other than the Arkansas River, is the closest waterfowl use area to the route corridor. The Two Buttes reservoir is about 80 years old, however, and is currently dry (personal communication, J. Slater 1990). Little runoff reaches the reservoir now because many range improvement structures (water catchments) have been placed upstream. Little other water is present south of this reservoir. Large waterfowl concentration areas are located north of the Arkansas River and east of the city of Lamar, but these are about 5 miles north of the entry point to IR-409. This area north of Lamar is identified as an important winter habitat area (Bellrose 1980) for waterfowl. According to CDOW, four SWAs containing at least some waterfowl habitat are located in the project area. There are no National Wildlife Refuges (NWRs) in the project area; the nearest is the Alamosa/Monte Vista NWR, which is located about 50 miles to the southwest.

3.4.3 Threatened and Endangered Species

The Albuquerque, New Mexico and Golden, Colorado offices of the U.S. Fish and Wildlife Service (USFWS) were contacted in January 1989 regarding the potential effects of SAC overflights on any federally listed, proposed, or candidate threatened or endangered species occurring on or near the Airburst Range or IR-409. The Denver and Colorado Springs offices of the CDOW were also contacted. Table 3.4-1 summarizes the information obtained from these agencies.

Five federally-listed bird species have the potential to occur in the study area. The peregrine falcon (*Falcon peregrinus*), which is federally listed as endangered, is a rare migrant in the eastern portion of the project area, but it forages along Fountain Creek and the Arkansas, St. Charles, and Huerfano rivers in the western portion of the project area. Nesting areas are located along the Huerfano and St. Charles rivers, both of which are crossed by IR-409 (CDOW 1990). The bald eagle (*Haliaeetus leucocephalus*), which is also federally listed as endangered, winters along streams and rivers such as the Arkansas, Purgatoire, West Carrizo and Fountain Creek, and near reservoirs such as John Martin Reservoir, often in areas where waterfowl concentrate. Six to ten wintering birds were recently observed on Two Buttes Creek in Baca and Las Animas counties, but they are rarely seen at Two Buttes reservoir, which is now dry (personal communication, J. Slater 1990). Only one or two wintering bald eagles have been observed in the Teller Reservoir area, about 2 or 3 miles east of the Airburst Range on Fort Carson (personal communication, S. Emmons 1989). The interior least tern (*Sterna antillarum athalassos*) and the piping plover (*Charadrius melodus*) both nest at Nee Noshe Reservoir, which is about 5 miles north of the entry point for IR-409. The piping plover nests at Nee Noshe (2 pairs) constitute the first nesting for this taxon in Colorado in 40 years (personal communication, M. Carter 1989). The whooping crane (*Grus americana*) is only an accidental migrant

in the area; its primary migration corridor is centered east of Colorado in central Kansas (McLung 1979). (The migration corridor for the foster parent flock at Grays Lake is in western Colorado.)

Bird species that are candidates for federal listing and are likely to occur in the study area include the ferruginous hawk (*Buteo regalis*), mountain plover (*Charadrius montanus*), long-billed curlew (*Numenius americanus*), western snowy plover (*Charadrius alexandrinus*), and white-faced ibis (*Plegadis chihi*) (USFWS 1989). All of these candidate species, with the exception of the white-faced ibis, which breeds in San Luis Valley west of the study area (Voeks and English 1981), are known to breed within the study area (Kingery and Dillon 1987). Ferruginous hawks are fairly common residents and breeders in shortgrass prairie and agricultural areas. Mountain plovers are rare to fairly common breeders throughout the project area, and they have been observed in areas within the corridor in Las Animas County (CDOW 1990).

Additional bird species of state concern that may occur in the study area include the white pelican (*Pelecanus erythrorhynchos*), greater sandhill crane (*Grus canadensis tabida*), and the lesser prairie chicken (*Tympanucus pallidicinctus*) (Kingery and Dillon 1987). Specific occurrences are presented in Table 3.4-1.

Only two protected mammals could potentially occur within the study area: the black-footed ferret (*Mustela nigripes*), which is federally and state-listed as endangered, and the river otter (*Lutra canadensis*), which is state-listed as endangered. Although there have been intensive searches for the black-footed ferret, which typically occurs near prairie dog towns, there have been no confirmed sightings in Colorado for 40 years. The river otter was believed to be extirpated from the state, but it has been reintroduced in a few drainages (e.g., the South Platte) outside the study area (Colorado Division of Wildlife 1978; 1989).

Because fish are not likely to be affected by the proposed action, they are not discussed in this report. No federally listed threatened or endangered plants or federal candidates are known to occur within the Airburst Range impact area, although there is potential for the Fremont goldenweed (*Haplopoppus fremontii* var. *monocephalus*), a category 2 federal candidate (personal communication, G. Belew 1989).

3.5 LAND USE

The IR-409 corridor overflies a total of ten counties: Baca, Bent, Custer, Fremont, Huerfano, Las Animas, Otero, Prowers, and Pueblo counties, all in Colorado; and Union County, New Mexico. All ten counties are predominantly rural, with small and dispersed populations (see section 3.9, Socioeconomics). Agriculture, mainly cattle and sheep grazing, is the predominant land use. Sensitive land uses in the vicinity of IR-409 and the Airburst Range are shown in Figure 3.5-1. Figure 3.5-2 depicts the proposed B-52 and B-1B racetracks in relation to these areas.

Airburst Range, on the southern end of the Fort Carson Military Reservation, lies in Pueblo County. Population in the vicinity of the range is sparse, with small towns and scattered farms and ranches. The city of Pueblo lies approximately 15 miles to the southeast of the range. Colorado Springs begins a few miles north of Fort Carson's northern boundary and approximately 20 miles north of the Airburst Range. The town of Penrose lies 5 miles to the west of the range.

Land use policies affecting Fort Carson and the surrounding area are administered by the Pikes Peak Area Council of Governments (PPACG), the Pueblo Area Council of Governments, the El Paso and Pueblo County Planning Commissions, and the Colorado Springs and Pueblo City Planning Commissions. In 1979, the Pueblo Regional Planning Commission produced a Pueblo Regional Comprehensive Plan to guide land use planning in Pueblo County. The Draft Land Use Element of the plan designates the portion of Pueblo County containing Fort Carson as a "Public Facilities -

Table 3.4-1

ENDA' GERED AND THREATENED BIRDS AND MAMMALS
PC.TEN'IALLY OCCURRING IN THE STUDY AREA[1]

Species	*Status*[2]	*Occurrence*
Birds		
Bald eagle	FE, SE	Migratory; winters occasionally along streams in central and eastern Colorado; Teller Reservoir at Ft. Carson.
Peregrine falcon	FE, SE	Occasional migrant; no known nesting areas.
Least tern	FE, SE	Breeds at Adobe Creek and Nee Noshe reservoirs; Spring/Fall migrant.
Whooping crane	FE, SE	Accidental migrant at Comanche NG.
Piping plover	FT[3], SE	Breeds at Nee Noshe Reservoir; Spring/Fall migrant.
Ferruginous hawk	C2, SP	Breeds; Summer resident.
Mountain plover	C2, SP	Breeds; Spring/Fall migrant at Comanche NG.
Western snowy plover	C2, SP	Breeds in lakeshore habitats in the area; Spring/Fall migrant.
White-faced ibis	C2, SP	Spring/Fall migrant at Comanche NG.
Long-billed curlew	C2, SP	Breeds, Summer resident at Comanche NG.
White pelican	--, SC	Spring/Fall migrant at Comanche NG. Non-breeding birds sometimes concentrate on Lake Meredith in Crowley County.
Greater sandhill crane	--, SE	Spring/Fall migrant at Comanche NG; nests in NW Colorado.
Lesser prairie chicken	--, ST	Yearlong resident at Comanche NG.
Mammals		
Black-footed ferret	FE, SE	Historical range included prairie dog towns throughout Colorado; no confirmed sightings in 40 years.
River otter	--, SE	Historical range included Arkansas River; now restricted to reintroduced population in Douglas County.

Notes:

1. Sources include letter from L. W. Carlson, USFWS to U.S. Air Force, 1989; Colorado Division of Wildlife 1978; 1989 (personal communication), Colorado Bird Observatory 1989 (personal communication). Fish are not included because no effects are likely from low-level overflights.
2. Status:
   FE = listed as endangered by the USFWS
   SE = listed as endangered by the state of Colorado
   C2 = candidate, category 2, for listing by the USFWS
   SP = protected by the state of Colorado as a non-game species
   SC = Formerly a state-threatened species; now considered a species of special concern
   ST = listed as threatened by the state of Colorado
3. Listed as endangered in Great Lakes watershed in states of Illinois, Indiana, Michigan, Minnesota, New York, Ohio, Pennsylvania, and Wisconsin.

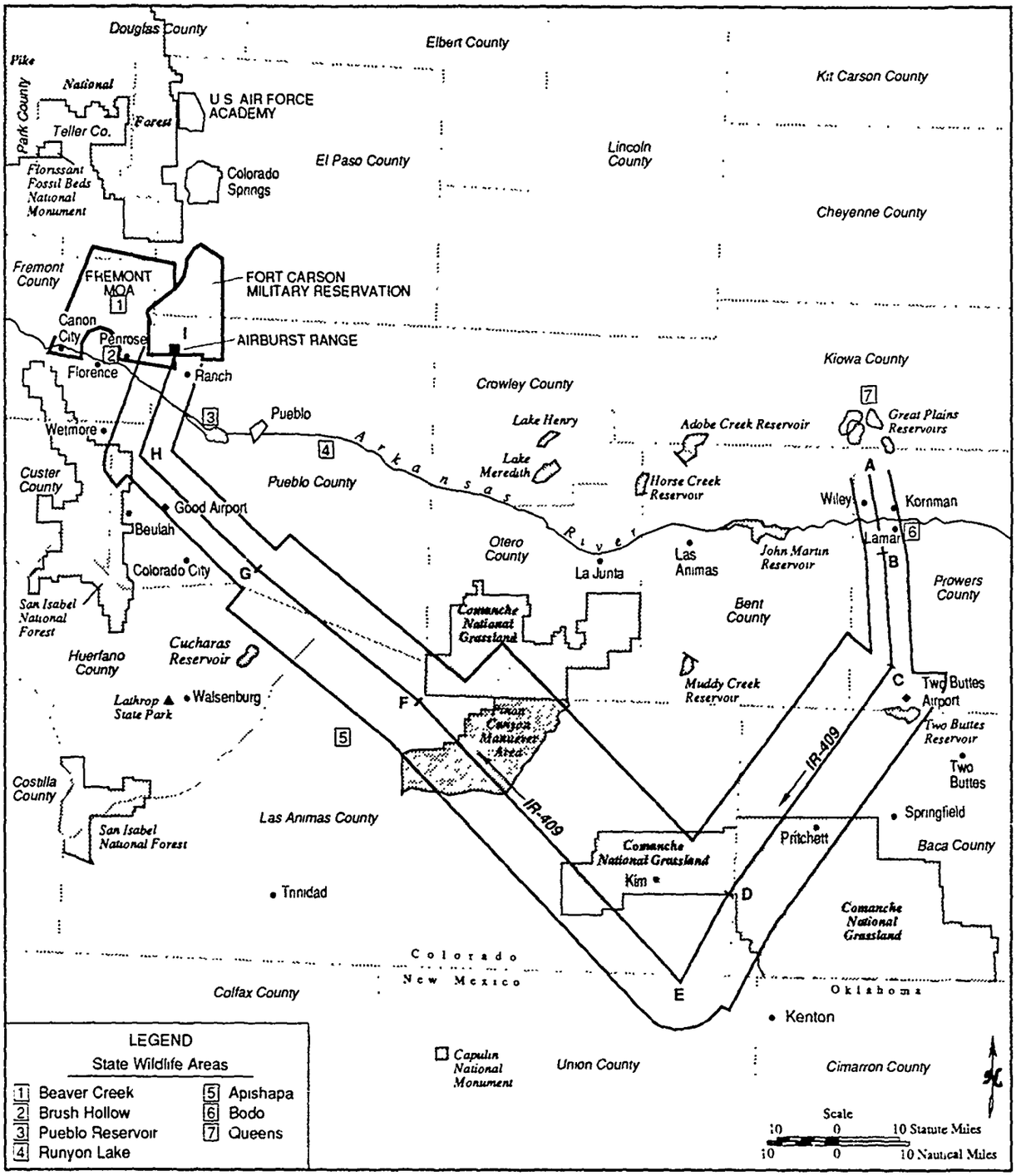


Figure 3.5-1

SENSITIVE LAND USES IN THE VICINITY OF THE AIRBURST RANGE AND IR-409

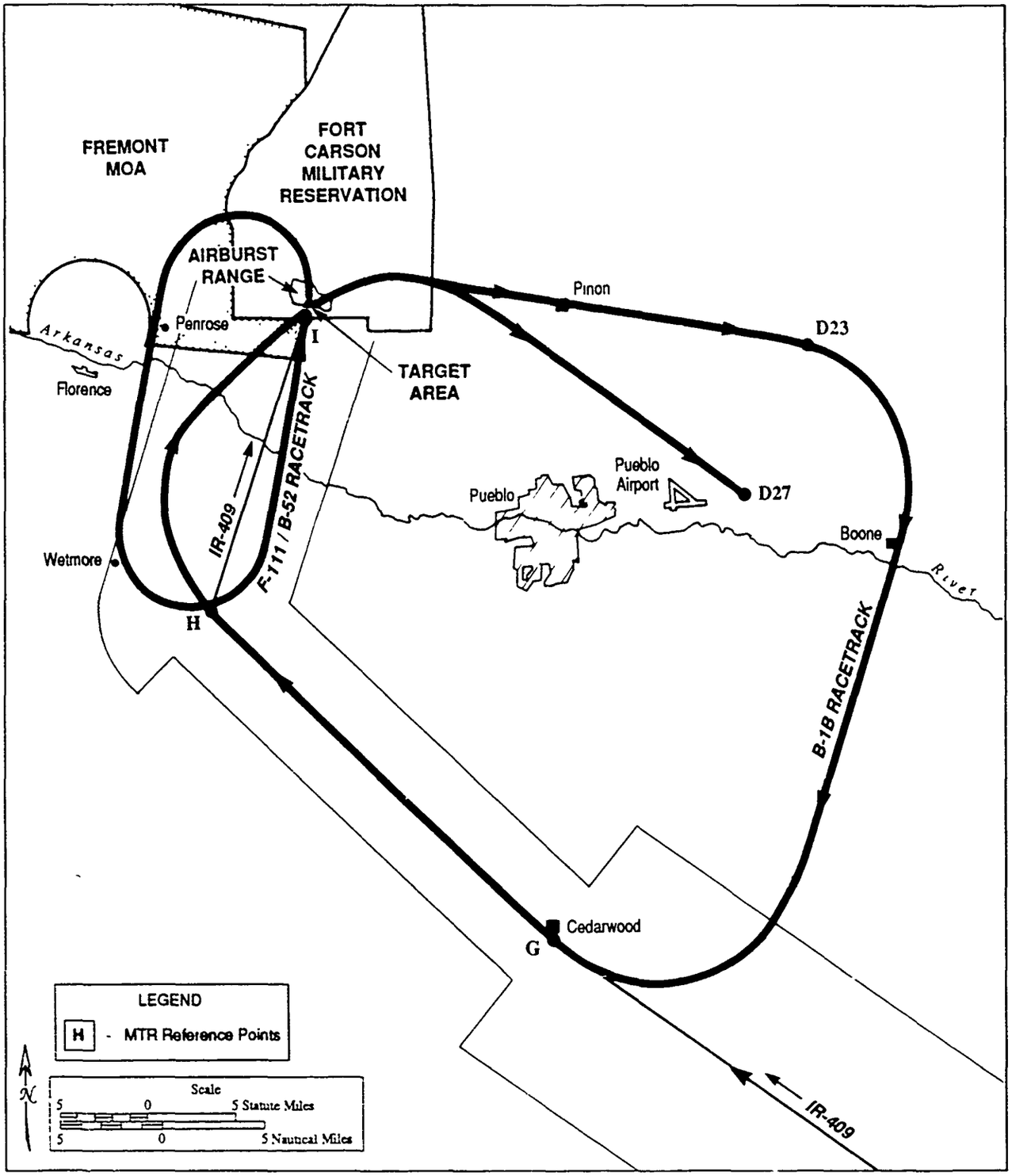


Figure 3.5-2

SENSITIVE LAND USES IN RELATION TO THE PROPOSED
B-52 AND B-1B RACETRACK PATTERNS

Federal Land Use" area. Surrounding land is principally designated as rangeland or open space (U.S. Army 1979).

Under the Army's Installation Compatible Use Zone (ICUZ) program, Fort Carson produced an ICUZ study in 1986 to (1) evaluate noise created by military activities associated with the installation and (2) provide land use guidelines for achieving compatibility between the needs of the military and civilian communities. According to the study, urbanization and residential development adjacent to Fort Carson boundaries has been continuous since the installation was established in 1942 and has accelerated since about 1970. Actual and planned development is occurring on all sides of the installation with the exception of portions of the southern boundary. These developments are shown in Figure 3.5-3. The lands which surround the Fort Carson Military Reservation have been divided into six land use compatibility areas, shown in Figure 3.5-4. These six areas are sensitive to noise and safety impacts from military operations on Fort Carson. Figure 3.5-5 shows these areas in relation to past and planned residential development adjacent to Fort Carson. Development of the area along the eastern boundary, in particular, may not be compatible with the noise and potential safety hazards associated with nearby military activities (U.S. Army 1986).

The ICUZ study encourages El Paso, Fremont, and Pueblo County officials to develop land use plans for the entire area bordering Fort Carson and to provide for a buffer zone between the installation boundaries and any area of proposed development. The study also encourages Pueblo County officials to limit further residential development around the southeast corner of Fort Carson in order to provide a buffer zone between the installation boundary and the existing Pueblo West development (U.S. Army 1986). Pueblo West is a rural-residential community located five miles southeast of the southern boundary of Fort Carson. The development consists of low-density residential and light industrial land use. Land surrounding the community is zoned for open space and agriculture (U.S. Army 1979). Residential development has also been initiated along the southwestern boundary of Fort Carson near the town of Penrose. The two subdivisions, located near Beaver Creek and Highway 115 (see Figure 3.5-3) are divided into 61 35-acre parcels; 20 to 30 of these parcels have been developed to date.

IR-409 overflies a large portion of the Pinon Canyon Maneuver Site (PCMS) in the northeastern corner of Las Animas County. The PCMS provides additional land for training maneuvers by battalions of the 4th Infantry Division (Mechanized) at Fort Carson. The area contains cantonment and bivouac sites and supports training exercises by wheeled and tracked vehicles, U.S. Army helicopters, and occasional U.S. Air Force tactical aircraft. Training exercises employ blank ammunition, simulators, and non-persistent training gas (e.g., tear gas). No live firing is conducted in the PCMS (U.S. Army Corps of Engineers 1980).

3.5.1 Recreation

The *1981 Colorado State Comprehensive Outdoor Recreation Plan* identifies the public land recreation resource base in southeastern Colorado as follows: USDA Forest Service, 73 percent; Bureau of Land Management, 18 percent; and other federal, state, city/county, and private, 9 percent (USDA 1984).

USDA Forest Service land in the vicinity of Fort Carson consists of the Pike and San Isabel National Forests in the Rocky Mountains. According to a Land Resource Management Plan prepared by the Forest Service in 1984, recreation use in these two forests totaled more than 3,830,000 visitor days in 1983. "Dispersed" recreational use accounted for 2,425,000 visitor days, or 63 percent of the total use. These activities include pleasure driving, off-road vehicle (ORV) use, hiking and camping in undeveloped sites, fishing, hunting, and viewing scenery. Motorized touring, both on- and off-road, is the most popular recreation activity on the forest and is attributed to the area's highly scenic visual resources and rugged terrain. Use of developed sites, including campgrounds, picnic grounds, visitor centers, overlooks, trailheads, and ski areas, made up the remaining 37 percent of recreational use in the Pike and San Isabel National Forests (USDA 1984). IR-409 passes over a small portion of the San Isabel National Forest near Point H (see Figure 3.5-1).

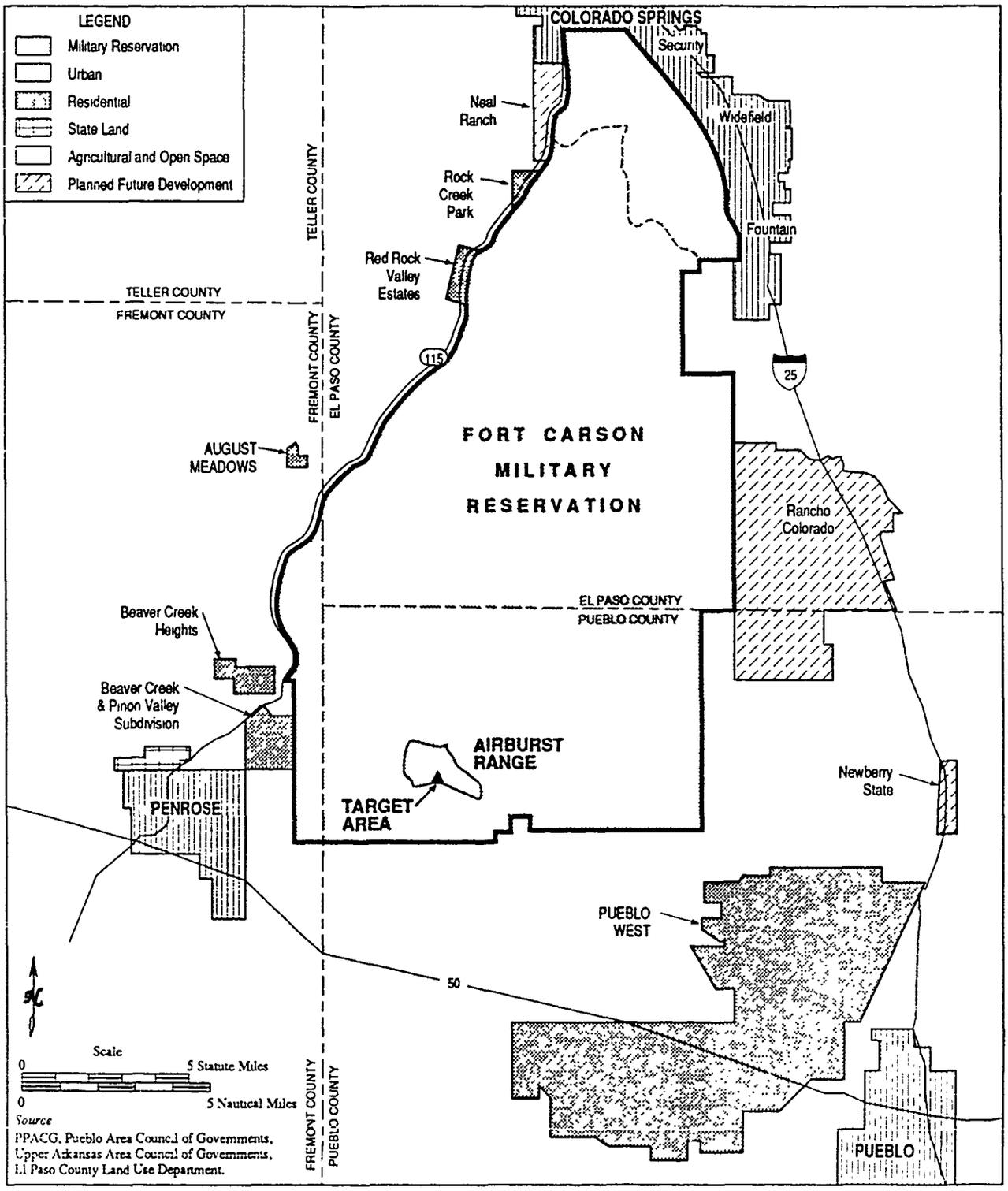


Figure 3.5-3

RESIDENTIAL DEVELOPMENT SURROUNDING THE FORT CARSON MILITARY RESERVATION

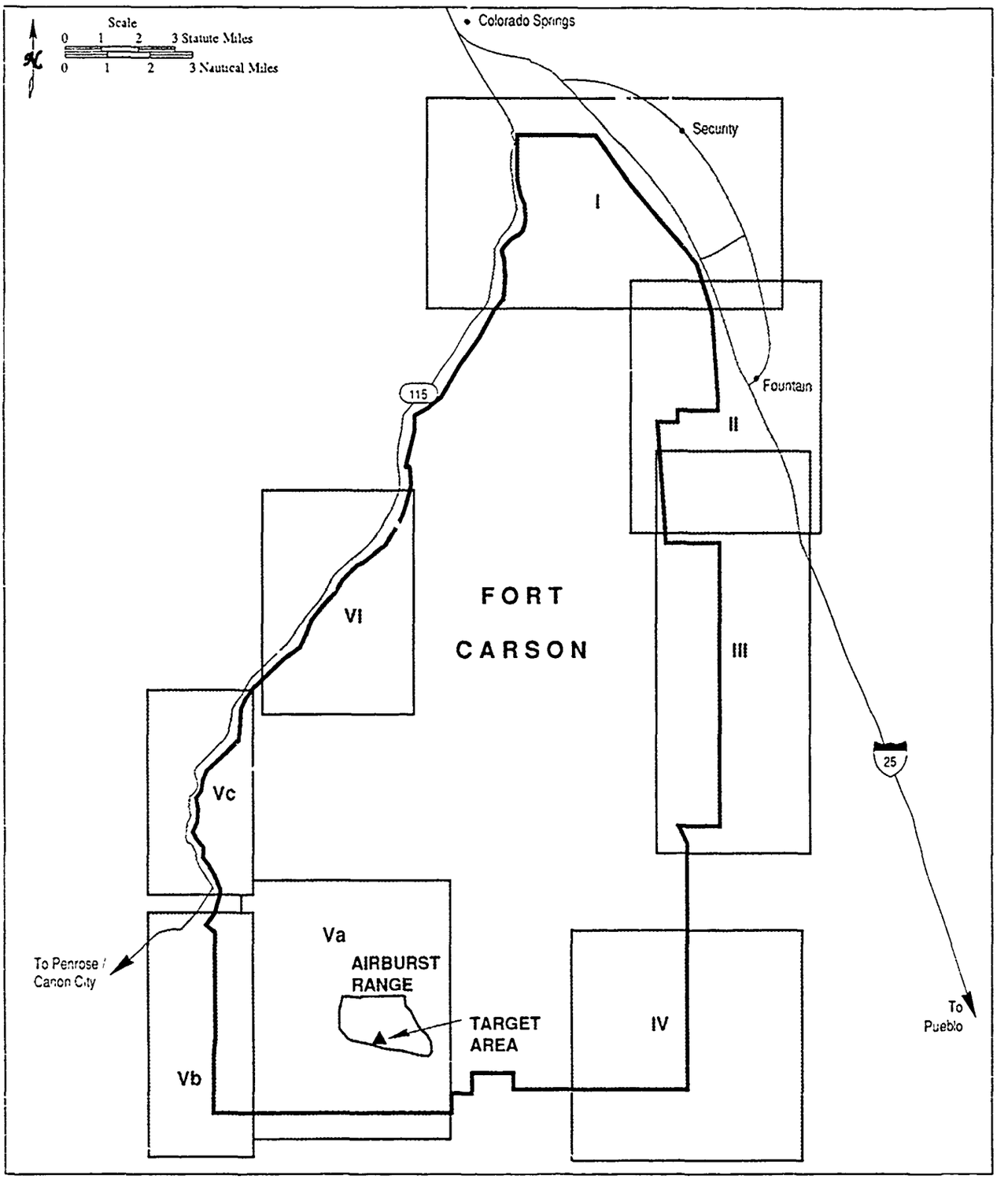


Figure 3.5-4

NOISE-SENSITIVE AREAS IN THE VICINITY OF THE
FORT CARSON MILITARY RESERVATION

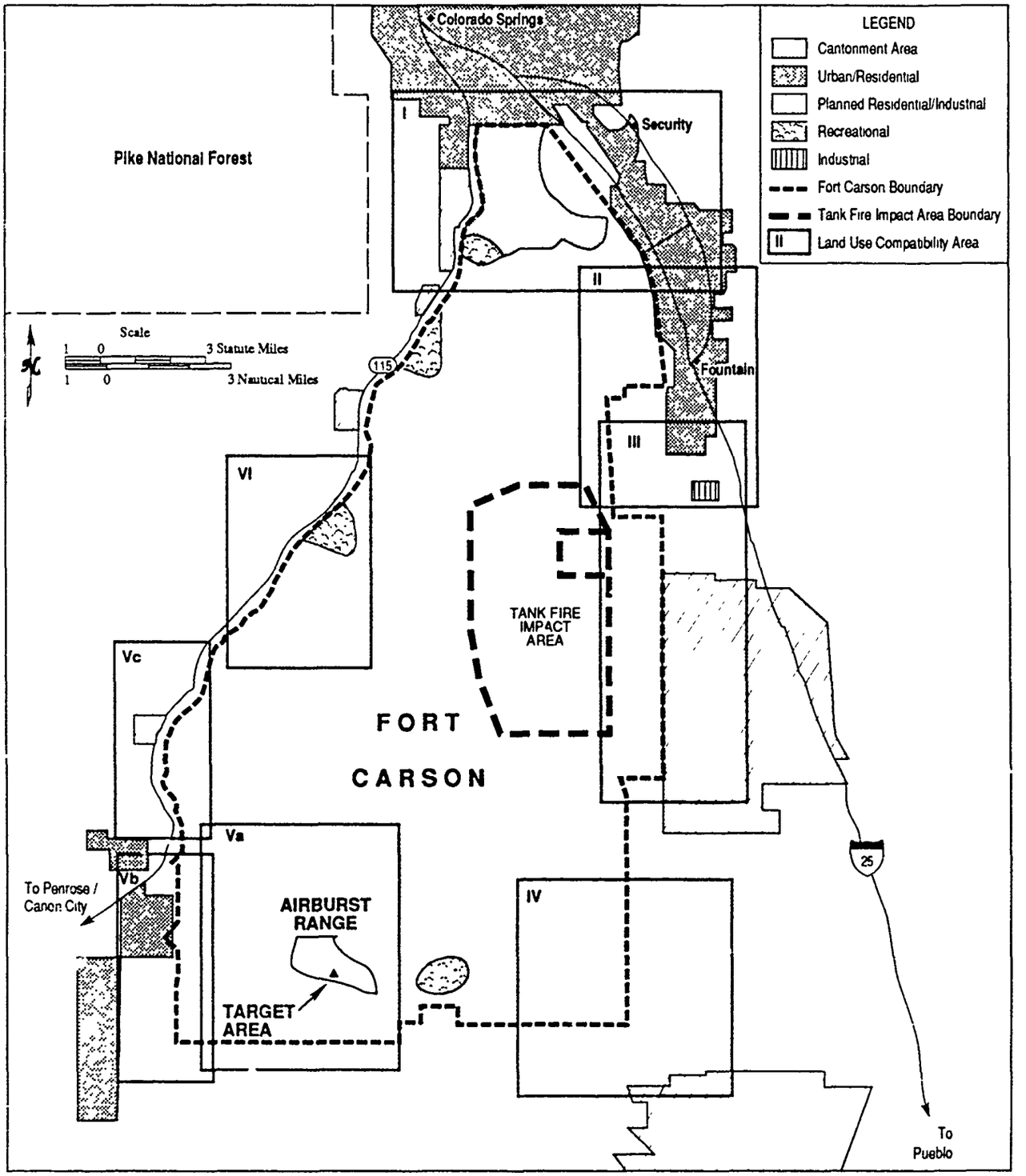


Figure 3.5-5

NOISE-SENSITIVE AREAS AND AREAS OF RESIDENTIAL DEVELOPMENT ADJACENT TO THE FORT CARSON MILITARY RESERVATION

Farther east, IR-409 crosses large portions of the Comanche National Grassland, which is also administered by the U.S. Forest Service. In addition to livestock grazing and wildlife habitat management, the grassland currently supports recreational uses including hunting and fishing.

The IR-409 route corridor comes near to, but does not cross, six State Wildlife Areas (SWA) in southeastern Colorado: Queens SWA in Kiowa County, just north of the route origin; Bodo SWA in Prowers County; Apishapa SWA in Las Animas County; Pueblo Reservoir SWA in Pueblo County; and Beaver Creek and Brush Hollow SWAs, both in Fremont County. In addition, B-1B aircraft using the proposed racetrack pattern east of Pueblo would overfly the Runyon Lake SWA at 10,000 feet MSL. B-52s using the racetrack through the Fremont MOA would fly just east of the Beaver Creek and Brush Hollow SWAs at 1,500 feet AGL. These SWAs provide habitat which supports wildlife and fish and encourage such recreational activities as hunting, fishing, hiking, picnicking, wildlife observation, and photography. In addition, camping, boating, and other water sports are available at the Queens SWA.

Outdoor recreation activities are not restricted to national forest or SWA land. Hunting, fishing, and ORV use are popular throughout southeastern Colorado, although data on current use are minimal. On Fort Carson, hunting and fishing are allowed by permit. Hunters must check in daily and obtain a range pass, and no hunting is allowed when the Army is maneuvering in the area. Fishing is allowed at Teller Reservoir, east of the Airburst Range.

3.5.2 Nationally Protected Lands

As described above, the IR-409 route corridor passes over large portions of the Comanche National Grassland in Baca, Las Animas, and Otero counties. These lands encompass a total of 419,000 acres in two separate units. Since the mid-1800s, this land had been used extensively for cattle ranching and homesteading. Many years of overgrazing and overplowing the land, combined with drought and severe winds, resulted in the Dust Bowl of the 1930's. In 1938, the federal government established the Federal Land Purchase Program and, between 1938 and 1954, spent millions of dollars turning this severely damaged land back into production (USDA n.d.).

The Comanche National Grassland currently supports livestock grazing, wildlife habitat management, and recreational uses including hunting and fishing. The grassland has 193 grazing allotments that produce about 102,000 animal unit months (AUMs) of grazing use by domestic livestock each year. Since Conservation Practice Funds were made available from grazing fees in 1978, ranchers have made range improvements including hundreds of miles of pipeline, stock water tanks, new and replacement fence, wells, and water pits. Some of these improvements have increased the availability of water to wildlife as well.

The IR-409 route corridor crosses a small portion of the San Isabel National Forest in Custer and Pueblo counties. Recreation use of the Pike and San Isabel National Forest is described in the previous section. Wildlife habitat associated with the forests is discussed in section 3.4, Biological Resources. As described in the previous section, the route corridor and proposed racetracks for SAC aircraft come near but do not cross seven SWAs.

Airburst Range is not part of or near any state or nationally protected lands (see Figure 3.5-1).

3.6 VISUAL RESOURCES

Visual resources constitute the natural and manmade features that give a particular environment its aesthetic qualities. IR-409 passes over great open expanses of rangeland that are broken occasionally by buttes and wooded streams. Visual clarity along the route is extremely high.

Visual disturbance from aircraft overflights is most likely to occur when the planes are flying at very low altitude, particularly from Point C to Point G where aircraft currently fly as low as 300 feet AGL. However, given the extremely low population density beneath the entire route corridor (an average of 5.2 persons per square mile; see section 3.7, Socioeconomics) and the low number and frequency of overflights, most aircraft using IR-409 probably go unnoticed.

Airburst Range lies on an open plain with unobstructed views of the Rocky Mountains to the west and long vistas in other directions. Aircraft entering the range from IR-409 maintain an altitude of 1,000 feet AGL until they pass Highway 50 and then descend as low as 300 feet AGL over the Airburst Range. Very few people reside or recreate in the vicinity of the range. The closest community, the town of Penrose, is about 5 miles to the west of the range. The effects of current aircraft activities on visual resources are minimal.

3.7 CULTURAL RESOURCES

The primary source of data for this section was the *Historic Preservation Plan for Fort Carson Military Reservation, Colorado* (Centennial Archaeology 1987). This document presents current data about all known cultural resources on the reservation, discusses their potential eligibility for listing on the National Register of Historic Places (NRHP), presents a predictive model describing patterns of site location, and identifies areas of sensitivity, among other things.

Almost 44,000 acres (32 percent) of the Fort Carson Military Reservation have been intensively surveyed for cultural resources. As of December 1987, 158 prehistoric, 62 historic sites, and 97 isolated artifacts or features have been recorded. Prehistoric sites range from about 12,000 to 500 years B.P. and include open lithic scatters, rock art sites, a large number of rockshelters, talus slope shelters, quarries, stone architectural sites, wickiups, and isolated features such as hearths and tool sharpening grooves. Historic sites are associated primarily with homestead and ranch settlement and hardrock mining activities that occurred during and after gold was discovered in the Pike's Peak region.

The Historic Preservation Plan (HPP) indicates that seven prehistoric sites (4.4 percent) are listed on the NRHP. One of these sites is a district that includes numerous examples of rock art. Three other prehistoric sites (1.9 percent) have been determined to be eligible for NRHP listing; nine (5.7 percent) were judged to be "probably eligible;" 65 (41.1 percent) need further evaluation; and 75 (47.5 percent) were deemed ineligible because they include only surface remains, are severely disturbed, or consist of tool sharpening grooves (which lack information potential). No historic sites have been placed on the NRHP, but one historic settlement (0.02 percent) has been determined to be eligible, two others (0.3 percent) appear eligible, 19 (31 percent) are not considered eligible, and the remaining 40 (65 percent) have not been evaluated.

A major focus of the Fort Carson HPP was the development of a series of models which attempt to predict prehistoric and historic patterns of settlement on the basis of existing information. The authors of the HPP took a sample of known site locations and a sample of areas known to lack sites ("nonsites"), determined the environmental correlations of each group, and projected these findings to areas within the installation that have not yet been surveyed for cultural resources. In areas where modeling was difficult or impossible, the statistical results were augmented with judgmental assessments based on available data.

Results of the analysis allowed the identification of various zones of cultural resource sensitivity as well as greater empirical insight into past human use of the area. For present purposes, the sensitivity zones are of most interest because they allow an assessment of the proposed action's potential for disturbing or destroying cultural resources. A low sensitivity rating indicates that cultural resources are expected to occur in relatively low frequencies. In addition, the sensitivity zone analysis derived from the HPP did not discriminate between significant and insignificant sites. Any particular zone or area could contain sites that range from small, disturbed lithic scatters of little research potential to relatively

large, well-preserved prehistoric encampments eligible for listing on the NRHP. Finally, the sensitivity ratings primarily reflect the distribution of prehistoric rather than historic resources.

The results of the predictive modeling indicate that the Range 123 (Airburst Range) target areas are located in open grasslands generally considered to be low in sensitivity. However, this area is flanked by high sensitivity zones that paral. l and include Pierce Gulch and Booth Gulch, the latter of which contains the regionally important Stone City historic town and mining site which was platted in 1912. The site was once occupied by as many as 175 people, including a constable and a justice of the peace. It contained a post office, a railroad depot, a large hotel, two schools, several blacksmith shops, and other commercial and industrial businesses. The town had 100 people as late as 1950, but was all but abandoned by 1965 when the U.S. Army Corps of Engineers purchased the area to expand Fort Carson. Much of the townsite was subsequently bulldozed, although potentially significant historic remains still exist. Stone City is located on the east side of Booth Gulch. Airburst Range is located west of the gulch.

The presence of high sensitivity zones immediately adjacent to the F nge 123 does not imply the presence of significant sites. This zone merely represents an area with higher densities of sites, regardless of their significance. The types of sites expected to occur in this zone can be assessed by considering the results of a previous survey of Airburst Range and area 44 located immediately to the north. This survey (Alexander et al. 1982) covered about 30 percent of these areas, including the southern third of Airburst Range. No sites were found in Range 123 (Airburst Range) and only one isolated artifact (GR-15) was found. The survey of area 44, which includes a ridge formed by the confluence of Pierce Gulch and Booth Gulch, located three small sites, including a historic stock tank (PE-354), a historic rock shelter (PE-359), and a rock shelter with an associated pictograph (PE-355). Of these three sites, only the historic stock tank is located in the open grasslands that characterize Range 123. The survey of grassland portions of area 44 also located three isolated artifacts, including a chert biface fragment (GR-110), a chert flake (GR-111), and a quartzite flake (GR-112).

The results of the survey suggest that Range 123 may contain isolated prehistoric artifacts and a few historic remains associated with cattle grazing.

3.8 NOISE

Noise is considered to be unwanted sound that interferes with normal activities or otherwise diminishes the quality of the environment. It may be intermittent or continuous, steady or impulsive. It may involve a broad range of sound sources and frequencies and be generally nondescript, or it may have a specific, readily identifiable sound source. There is wide diversity among human responses to noise, which vary not only according to the type and characteristics of the noise source, but also according to the sensitivity and expectations of the receptor, the time of day, and the distance between the noise source (such as an aircraft) and the receptor (such as a person or animal).

Sound is measured with instruments that record instantaneous sound levels in decibels (dB). Using these measurements, sound levels for ' . idual noise events and average sound levels over extended periods of hours or days (e.g., the day ·· average sound level, L_{dn}, in dB) can be calculated.

3.8.1 Human Perception and Measurement of Sound

The physical characteristics of sound include its intensity and audio frequency. Sound intensity varies so widely -- from a soft whisper to a jet takeoff -- that its measurement (in dB) is based on a logarithmic scale. Sound measurement is further refined by using an "A-weighted" decibel scale, which emphasizes the audio frequency response curve audible to the human ear (between 1,000 and 6,000 cycles per second). All dB measurements used in this study are A-weighted.

Slight changes in loudness are difficult to detect because the human auditory system has difficulty registering even a 2-dB change unless the noise events occur within seconds. Under most conditions, a 5-dB change is required to be noticeable (U.S. EPA 1973). Because of limited human sensitivity, when the sound level is doubled as measured with a sound meter (a 3-dB increase), an individual perceives only a 23-percent increase in sound level (see Table 3.8-1). A tenfold increase in sound level (a 10-dB increase) is required to cause an individual to perceive a doubling in sound level. Appendix F contains the sound level values in dB for common sounds and for typical environments.

Table 3.8-1

Loudness Sensitivity

Actual Increase in Sound Level (dB)	*Perceived Increase in Loudness (%)*
1	7
3	23
5	41
10	100

Source: Impact Characterization of Noise including Implications of Identifying and Achieving Levels of Cumulative Noise Exposure. EPA Report NTID 73.4, 1973.

3.8.2 Averaged Sound Measurement

Several metrics have been developed to measure average noise levels associated with a particular time period (e.g., hour, day, or month). The most commonly used measure is the day-night noise level metric, L_{dn}. This is the A-weighted sound level (in dB) averaged over a 24-hour or one month period, with an additional 10-dB penalty added to noise events occurring between 2200 and 0700 hours. This penalty compensates for generally lower background noise levels at night and the additional annoyance of nighttime noise events. The L_{dn} is the preferred noise metric of the Department of Housing and Urban Development (HUD), the Department of Transportation (DOT), FAA, EPA, and the Veteran's Administration. The Army uses calculated L_{dn} values for its Installation Compatible Use Zone (ICUZ) program. From the analysis of noise-generating activities, noise contours can be plotted to define zones I, II, and III, which correspond to L_{dn} values below 65 dB, between 65 dB and 75 dB, and above 75 dB, respectively. Table 3.8-2 presents the recommended land uses for the ICUZ program noise zones. In general, an L_{dn} of 65 dB is compatible with most land uses, including residential.

An additional noise metric, the L_{dnmr}, has been developed specifically for MTRs by the Air Force under direction of the Armstrong Aerospace Medical Research Laboratory (AAMRL). This metric is currently being recommended by the AAMRL as the standard MTR noise metric for the armed services. It has been designed to account for the unique noise environment of MTRs, which involve highly sporadic events (i.e., flight operations). Individual low-level events are also different from typical community noise sources because of the rapid onset rate that can create a "startle" effect. The L_{dnmr} is the "onset rate-adjusted monthly day-night average, A-weighted sound level." It is similar to the L_{dn} in that it is an averaged metric with a 10-dB penalty for events occurring between 2200 and 0700 hours. However, it is an average for an entire month, utilizing the highest monthly sortie activity, and includes an additional 0- to 5-dB penalty to compensate for the "startle" effect of a low-altitude overflight.

Both L_{dn} and L_{dnmr} are averaged noise metrics that are responsive to infrequent, high noise level events. For example, a rural environment with a background noise level of 35 L_{dn} or L_{dnmr} or less would be raised to 60 L_{dn} or L_{dnmr} by a single daily low-level flight directly overhead lasting less than a minute.

More complete descriptions of noise metrics can be found in *Aviation Noise Effects* (Newman and Beattie 1985); *Environmental Protection Planning in the Noise Environment* AFM 19-10 (USAF 1978); and *Environment Noise Assessment for Military Aircraft Training Routes, Volume 2: Recommended Noise Metric* (Plotkin, Sutherland and Molino 1987).

3.8.3 Noise Effects on Humans

Noise is one of the most prevalent problems associated with low-altitude flight training routes and bombing range activities. The main issues concerning noise effects on humans are physiological effects (hearing loss and nonauditory effects), behavioral effects (speech interference, sleep interference, and performance effects) and subjective effects, such as annoyance. A detailed description of possible impacts of aircraft noise on human health is included in Appendix F.

3.8.4 Current Noise Levels

Existing noise levels in the vicinity of the Airburst Range and IR-409 were estimated using the ROUTEMAP noise model developed by AAMRL (USAF 1988). ROUTEMAP utilizes a database similar to that used for NOISEMAP, the principal program used for detailed noise analysis at Air Force bases. ROUTEMAP is a "line" model that calculates noise contours parallel to the MTR flight path. It has considerable flexibility in allowing various flight distributions about the centerline. A default value of 0.5 mile for instrument routes was used for the standard deviation from the centerline. ROUTEMAP interprets this to mean that about two-thirds of the aircraft fly within 0.5 mile of the route centerline. In addition, ROUTEMAP allows noise modeling of aircraft flying parallel to the centerline at various offset distances. Finally, the model calculates noise levels as a monthly average only (L_{dnmr} or L_{dn} [monthly] values) and requires monthly sortie data as input. However, since L_{dn} (daily) averages are identical to L_{dn} (monthly) values when flights occur every day, the model can be adjusted to provide L_{dn} (daily) values. Sortie data for 5-day-per-week operations can be adjusted upwards by a factor of 1.4 (7 divided by 5) in order to yield an L_{dn} (monthly) measure that corresponds to a daily average. Such an adjustment was made to derive L_{dn} (daily) values in the analyses described herein. All flights were assumed to occur between 0700 and 2200 hours.

3.8.4.1 Background Noise Levels

Background noise levels in the region are estimated to be quite low, with variations depending on the proximity to human activity. No long-term noise measurement data exist for the area beneath IR-409. However, measured values in rural areas with similar population densities and environmental conditions indicate that average noise levels of 35 to 45 dB probably exist in the region when no aircraft activity is present (USAF 1985). In remote areas, noise levels may be in the 25- to 30-dB range.

3.8.4.2 Average Noise Levels

Figure 3.8-1 illustrates the existing noise environment on the Fort Carson Military Reservation, including the Airburst Range, as described in the 1986 ICUZ study for Fort Carson. Noise levels and associated contours were generated by computer simulations (including NOISEMAP) and were not measured directly by noise monitoring equipment. Such equipment has recently been set up in some locations within Fort Carson to aid in future ICUZ studies. However, the system is in the early stages of development and the monitoring equipment is not focused on the Airburst range area of Fort Carson (personal communication, Kelm 1989).

Table 3.8-2

RECOMMENDED LAND USES FOR L_{dn}-BASED NOISE ZONES[1]

Land Use	NOISE ZONES *Zone I (Ldn < 65)*	*Zone II (Ldn 65-75)*	*Zone III (Ldn > 75)*
Residential (all uses)	Acceptable	Generally unacceptable[2]	Unacceptable
Manufacturing	Acceptable	Acceptable	Acceptable[3]
Transportation, communication, and utilities	Acceptable	Acceptable	Acceptable
Trade	Acceptable	Acceptable	Acceptable[3]
Public services	Acceptable	Generally unacceptable[2]	Unacceptable
Cultural, recreational, and entertainment	Acceptable	Generally unacceptable[2]	Unacceptable
Agricultural	Acceptable	Acceptable	Acceptable
Livestock farming and animal breeding	Acceptable	Acceptable	Unacceptable

Notes:
1. Ldn is the dBA level averaged over a 24-hour period.
2. Use is generally discouraged; however, if allowed, sound attenuation techniques should be required.
3. For a Ldn level above 75, sound attenuation techniques should be required.

Source: Georgia Institute of Technology 1987.

As indicated in Figure 3.8-1, noise which exceeds the 75 L_{dn} level (Noise Zone III) is confined to the Fort Carson reservation; however, noise in excess of the 65 L_{dn} level (Noise Zone II) extends into civilian owned land just outside the southern and southwestern portions of the reservation boundary. Land use in these areas is described in section 3.5, Land Use.

ROUTEMAP was used to estimate the existing noise levels in the vicinity of the Airburst Range, the F-111 racetrack to the west, and IR-409. The modeling effort focused only on noise generated by fixed-wing aircraft that are directly associated with the range. Artillery fire, tank maneuvers, helicopter activity, and other nearby noise sources were not analyzed due to limitations in the applicability of the model. Aircraft operations other than those at Airburst Range were also not addressed because of the complexity and diversity of training activities occurring throughout the Fort Carson area, a lack of detailed operations data, and because the proposed action would be focused on the Airburst Range only.

As a result of these factors, the noise levels derived from ROUTEMAP for the immediate range area underestimate the actual noise levels within reservation boundaries. For these areas, the ICUZ noise contours shown in Figure 3.8-1 better represent current noise levels since many different types of noise sources are accounted for in the ICUZ modeling effort. However, ROUTEMAP adequately represents the noise environment found along the F-111 racetrack and along IR-409. Average baseline noise levels in these areas are 65 dB or less (L_{dnmr} and L_{dn} [daily]) and are reported in detail in Table 4.8-1 in section 4.8.

3.8.4.3 Single-Event Noise Levels

The major impact of aircraft noise pollution is in the form of annoyance. While the average number and frequency of overflight events is one factor influencing public annoyance, the high noise level associated with a single event, particularly when combined with a startle effect, can be highly annoying or frightening by itself. Aircraft exhibit different noise-generating characteristics depending on the design of the aircraft, engine size and type, flight procedures, etc. The impact of the noise on someone standing on the ground depends on the type and speed of the aircraft, the slant distance between the observer and the aircraft, noise attenuation provided by any vegetation or structures in the area, and personal characteristics of the observer. For example, an individual's noise sensitivity may be a function of his or her appreciation of aircraft in general or understanding of the purpose of the flight activity.

Table 3.8-3 presents maximum single-event noise values as a function of slant distance for the four types of aircraft currently accessing Airburst Range. For comparison, values are also provided for the B-52 and B-1B aircraft that are proposed for use in the area. The values shown do not account for possible noise attenuation from vegetation or geologic and man-made structures. In general, flights at very low altitudes generate high noise levels directly below the flight, but the noise is more susceptible to the effects of attenuation as distance from the groundtrack increases. The noise generated by higher altitude flights, while not as loud directly below the aircraft, cannot be attenuated as much. Single event noise levels that would be experienced at various communities in the Airburst/IR-409 area as a result of the proposed action are further described in section 3.9, Socioeconomics.

3.9 SOCIOECONOMICS

In a general sense, the term socioeconomics describes the many attributes and issues associated with the human environment. These might include employment, housing, demographics, etc. With regard to the proposed action, the relevant socioeconomic concerns involve the identification of communities in the vicinity of IR-409 and the Airburst Range, the level of public annoyance and acceptance associated with the flight activity in these areas, and the potential for impacts on local economic activities.

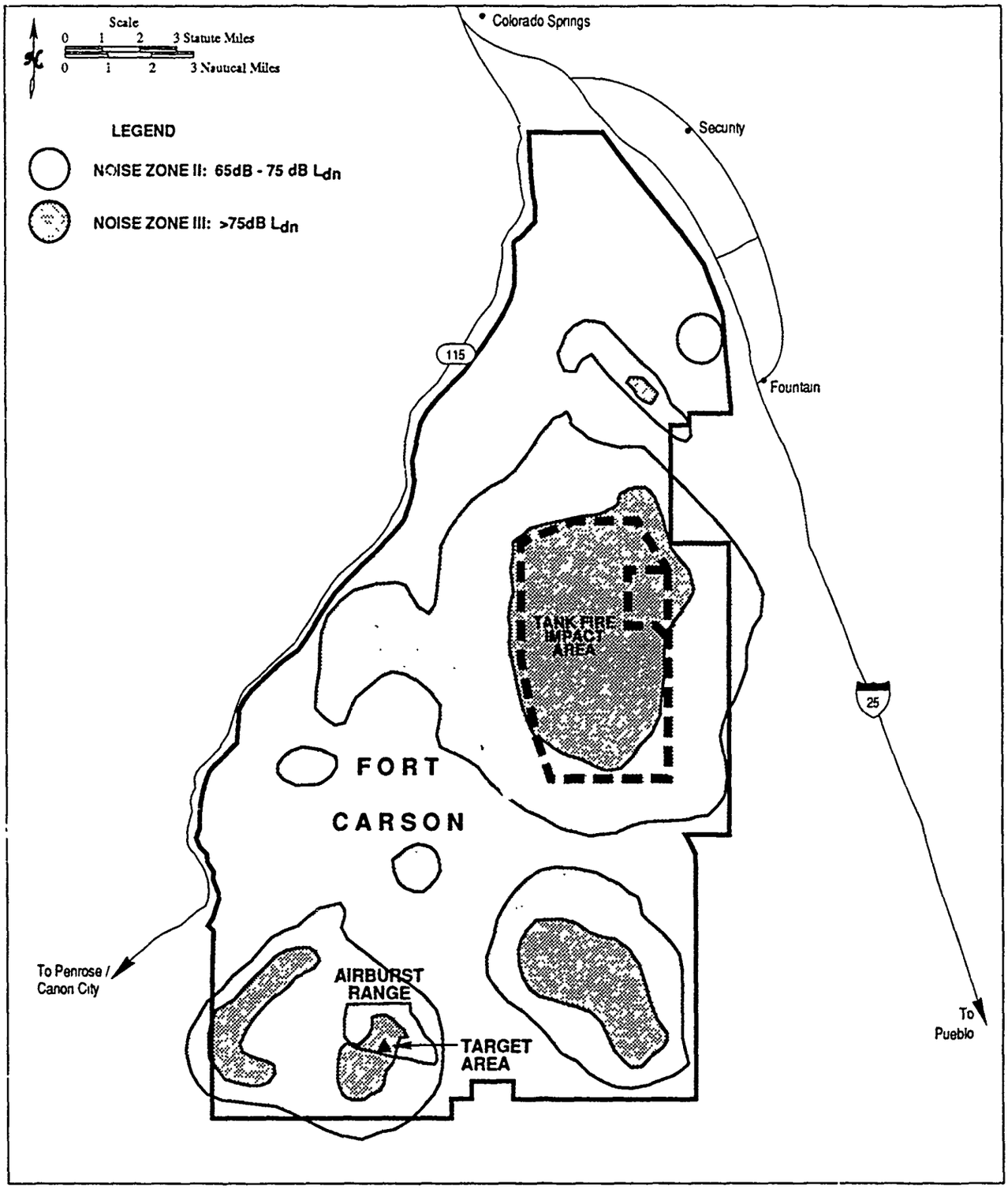


Figure 3.8-1

EXISTING NOISE ENVIRONMENT ON THE FORT CARSON MILITARY RESERVATION

Table 3.8-3

MAXIMUM SINGLE-EVENT NOISE LEVELS AS A FUNCTION OF SLANT DISTANCE
(dB)

Slant Distance (feet)	AIRCRAFT TYPE					
	A-7 [1]	*F-4* [2]	*F-16* [3]	*F-111* [4]	*B-52H* [5]	*B-1B* [6]
315	109.2	118.5	106.7	107.1	108.0	120.5
400	106.7	116.1	104.3	104.6	105.1	118.3
1,000	96.1	106.2	94.2	94.4	92.6	109.1
2,000	87.4	98.1	85.7	86.0	81.7	101.5
4,000	77.9	88.9	76.0	77.0	71.0	93.1
6,300	70.7	81.9	68.5	70.4	64.2	86.6
10,000	62.3	74.1	60.1	63.2	57.0	79.0
20,000	46.4	60.1	46.5	50.8	44.9	64.8

Notes:
1. Assumes airspeed of 450 knots, power setting of 95 percent rpm.
2. Assumes airspeed of 550 knots, power setting of 98 percent rpm.
3. Assumes airspeed of 500 knots, power setting of 85 percent rpm.
4. Assumes airspeed of 350 knots, power setting of 90 percent rpm.
5. Assumes airspeed of 340 knots, power setting of 4,500 pounds/hour.
6. Assumed airspeed of 550 knots, power setting of 98 percent rpm.

Source: Omega 10r computer program, USAF 1988.

3.9.1 Population

The Airburst Range is situated in the southcentral portion of the Fort Carson Military Reservation in northwestern Pueblo County. The area is essentially uninhabited except for scattered ranches and the town of Penrose, located about 5 miles to the west of the range. The population of Penrose was estimated in 1987 at 4,000 people. Somewhat more distant are the towns of Florence (3,000 people; about 12 miles southwest), Canon City (22,000 people; 17 miles west), and Pueblo West (4,000 people; 8 miles to the southeast). As shown in Figure 3.5-2, Penrose, Florence, and Canon City are also located within a relatively short distance of the F-111/B-52 racetrack.

Population information for the IR-409 route corridor is provided in Table 3.9-1. A total of 9,164 people are estimated to reside within the boundaries of the route corridor, an average of approximately five people per square mile. Selected communities that might be influenced by flights along IR-409 are described in Table 3.9-2 (refer to figures 3.5-1 and 3.5-2 for the locations of these communities in relation to the Airburst Range, IR-409, and the racetracks). Other small communities (Thatcher, Delhi, Portland, Good Pasture, Siloam, Swallows, and Pinon) can be seen on aeronautical charts and other maps of the area but have long since declined in population to the point of being functionally nonexistent. Conversations with county planners indicate that few, if any, people still reside in these areas.

3.9.2 Public Acceptance

Low-level military flights are often controversial, particularly when passing over communities or sensitive environmental areas. Public concerns may include excessive noise and noise-related effects, a general incompatibility with peaceful rural settings and living patterns, and the potential for aircraft mishaps. Potential noise-related impacts include startle effects on people, livestock, and wildlife; damage to structures; interference with communications and Native American religious ceremonies; and sleep disturbance. These types of impacts may result in a general state of annoyance with military operations and a corresponding reduction in public acceptance.

Few scientific studies, however, have been conducted to address these issues. Most studies have focused on the responses to aircraft noise from people living in the vicinity of airports. These studies have limited applicability to the low-level training context because the emphasis has been placed on public response to noise alone. Other factors relevant to public annoyance, such as safety concerns, are not considered. Also, flight operations at airports differ from low-level military training operations. For instance, take-offs and landings do not occur along training routes. Similar contextual differences between airports and MTRs exist in regard to frequencies of flights, population densities of affected areas, knowledge about the purpose of flights, characteristics of aircraft flown, and the potential economic links to the flights.

Essentially, the problem in the low-level route context is one of intermittent, intrusive events. Overflights may occur at unpredictable times, in locations that may vary from directly overhead to one or more miles to either side of the receptor, and at altitudes that seem very low. The rapid speeds of the aircraft result in a sudden onset and conclusion of the intrusive event. Aircraft that fly low-level routes may raise safety concerns or anti-military or anti-outsider sentiments. Also, individuals may question why their homes or ranches are the focus of flying activities from unknown origins and for uncertain purposes. In general, public acceptance of low-level training flights is greatly increased when the public understands the reasons for low-level training operations in a particular area.

Land use in the vicinity of the Airburst Range and beneath IR-409 is predominantly undeveloped wilderness and vacant land, interspersed with small towns and villages. Farming and ranching are the primary economic activities in the area. Population centers are avoided as much as possible (per Air Force standard procedures) in order to minimize noise impacts. In general, public acceptance of military training activities at the Airburst range and along IR-409 is moderate to high. Very few people

reside within close proximity of the range and very few noise complaints are received as a result of range operations (personal communications, Dronenburg 1989 and Krikorian 1989). The majority of the complaints that are received pertain to other Fort Carson training activities such as artillery fire and special close air support exercises.

Historically, the town of Penrose has been the source of 98 percent of all noise complaints at the range (personal communication, Krikorian 1989). An estimated 90 percent of those complaints were received from one person. In the past, the range received as many as one or two complaints per flight, associated primarily with F-111 flight activity. Since about 1981, however, when an F-111 groundtrack was developed and the minimum altitude was raised, the range has received an average of five complaints per year, usually associated with special exercises which occur only periodically.

Correspondence with park and recreation officials and county planners indicate that there are no current impacts or concerns associated with military flight training along the route (see section 3.6, Land Use, and Appendix F).

3.9.3 Economic Setting

Low-altitude military training may potentially affect economic activities. For example, interruption of the peace and serenity associated with parks and recreational areas may have repercussions on the tourist industry. Similarly, the productivity of livestock could theoretically be affected by the startle effects caused by frequent overflights. There is no evidence, however, that tourism or other local economic activities are being impacted by current low-level flights along IR-409 or near the Airburst Range (see section 3.6, Land Use). Military training flights do not usually occur on weekends or holidays, when most recreational activities occur, and research studies indicate that cattle and other livestock are minimally affected by low-flying aircraft (see section 4.6, Land Use).

3.10 AIRSPACE MANAGEMENT

Airspace management is defined as the management of the volume of air that blankets the geopolitical borders of the United States and its territories and extends from the surface to infinity. Four types of airspace exist above the United States: special use, other airspace areas, controlled, and uncontrolled. Special use airspace includes alert areas, controlled firing areas, military operations areas, prohibited areas, restricted areas, and warning areas. Other airspace areas include airport traffic areas, airport advisory areas, and military training routes. Controlled airspace includes continental control areas, control areas, control zones, terminal control areas, radar service areas, and transition areas.

The management of airspace and its assignment to military and civil users is quite complicated. Low-level MTR airspace, such as the instrument training route (IR-409) that SAC proposes to use, is established by the FAA at the request of DOD. The FAA recognizes that the military must meet its mission requirements and maintain its combat readiness capabilities. DOD regulates airspace within which training can be conducted free of interference with aircraft flying instrument flight rules (IFR). The FAA has written regulations to be observed by airspace users and has issued handbooks defining the types of airspace and the operations which may occur therein. Airspace that would be affected by the proposed action is defined and discussed in the following sections.

3.10.1 Military Operations Area (MOA)

A MOA consists of airspace of defined horizontal and vertical dimensions. The purpose of a MOA is to separate certain types of military training activities from IFR traffic (ASA Publications, Inc. 1989). Military training necessitates that aerobatic and abrupt flight maneuvers be practiced. MOAs are designed to promote air safety through civil pilot awareness, i.e., high-speed military aircraft may be engaged in complex maneuvers in an active MOA. The floor of a MOA can be as low as land surface and the ceiling as high as 18,000 feet MSL. Whenever a MOA is active, non-participating IFR traffic

Table 3.9-1

POPULATION DISTRIBUTION BENEATH THE IR-409 ROUTE CORRIDOR

County	*Population* [1]	*Density* [2]
Prowers County, Colorado	5,374	18.30
Bent County, Colorado	38	0.65
Baca County, Colorado	920	1.36
Las Animas County, Colorado	334	0.18
Union County, New Mexico	105	0.25
Otero County, Colorado	1	0.02
Huerfano County, Colorado	29	0.30
Pueblo County, Colorado	1,258	2.56
Fremont County, Colorado	1,105	14.40
TOTAL POPULATION WITHIN CORRIDOR:	9,164	
AVERAGE POPULATION DENSITY:		5.28

Notes: 1. Number of people residing within the geographical boundaries of the route corridor.
2. Population per square mile.

Source: ORNL Low-Altitude Airspace Database, 1988.

Table 3.9-2

SELECTED COMMUNITIES ALONG IR-409 AND THE AIRBURST RACETRACK

Town	*County*	*Population*
Lamar	Prowers	9,500
Wiley	Prowers	500
Kornman	Prowers	50
Pritchet	Baca	181
Kim	Las Animas	100
Penrose	Fremont	4,000
Canon City	Fremont	22,000
Florence	Fremont	3,000
Pueblo West	Pueblo	4,000
Boone	Pueblo	462

Source: SAIC 1989.

may be cleared by ATC to fly through the area if IFR separation can be provided by ATC. Civil and military aircraft operating under visual flight rules (VFRs) can transit an active MOA without ATC clearance. However, they are advised to exercise extreme caution due to the highspeed jet operations (AOPA 1989).

MOAs supplement low-level flying routes by providing the additional airspace that aircrews require to practice self-defense tactics, terrain-following flight, and fighter-intercept training. Such training is needed to achieve and maintain the skill level required for proficiency under combat conditions. Dissimilar Air Combat Maneuvering (DACM) within MOAs enables different types of fighter and bomber aircraft to practice avoidance, diversion, and aggressor tactics. DACM training realism can be enhanced by the addition of simulated threats such as surface-to-air missile, anti-aircraft artillery, and threat radar simulators.

Aircraft using IR-409 between points E and F transit airspace assigned to the Pinon Canyon MOA. The MOA extends from 100 feet AGL to 10,000 feet MSL, and is used principally by Fort Carson training exercises. The FLIP AP/1B states that all military aircraft flying IR-409 should monitor the Army frequency used in this area to avoid any air traffic conflicts.

Under the proposed action, B-52 aircraft would use airspace assigned to the Fremont and La Veta Low MOAs while flying the racetrack west of Airburst Range. These MOAs consist of the following assigned altitudes:

- Fremont MOA 1,500 feet AGL to, but not including, flight level (FL) 180 (18,000 feet MSL).
- La Veta Low MOA - 1,500 feet AGL to 13,000 feet MSL.

B-52 aircraft using the established F-111 radar racetrack pattern would traverse the Fremont and La Veta Low MOAs at an altitude of 3,000 feet AGL. Aircraft would begin their descent to 1,000 feet AGL after initiating the turn to reenter the IR-409 corridor (at approximately Point H) for subsequent passes on the Airburst Range. The point at which the turn to final and the descent would be initiated is approximately 9 NM south of the town of Penrose. B-1B aircraft would not use either of the above MOAs, but would operate on IR-409 or within the ATC system under the guidance of Denver Center and Pueblo Approach Control.

3.10.2 Restricted Area

Restricted areas are established due to the existence of unusual hazards to aircraft (FAR Part 71). These hazards could include air-to-surface bombardment, aerial gunnery, ground-to-air missile operations, and artillery firing associated with weapons ranges or test ranges. Transiting a restricted area without authorization from the using or controlling agency could be extremely hazardous to the aircraft and its occupants.

Under the proposed action, SAC aircraft would use the restricted airspace above Fort Carson Military Reservation: R-2601. R-2601 extends from the surface to 35,000 feet MSL. This airspace is never released back to ATC for use by civil aircraft.

3.10.3 Military Training Route (MTR)

MTRs are developed mutually by DOD and FAA to provide for military operational and training requirements that cannot be carried out under the terms of FAR Part 91.70. FAR Part 91.70 does not permit indicated airspeeds greater than 250 knots at altitudes below 10,000 feet MSL. The FAA has issued a waiver to the DOD to permit flight operations below this altitude at subsonic airspeeds in excess of 250 knots when operating on approved MTRs (DOD FLIP AP/1B 1989). All routes must be

scheduled through the designated scheduling authority. Briefing items include informing the user of bird activity, noise sensitive areas, unpublished obstructions or airports, air searches, and forest fires. Furthermore, the ARTCC notifies the designated tie-in flight service station (FSS) of the schedule so that the information can be disseminated to civil aircraft operators. All military users must remain within the confines of the MTR corridor and the assigned altitudes. When practicable, all low-level MTR operations avoid flight within 1,500 feet AGL over or 3 NM to the side of any airport (FLIP 1989).

All instrument route (IR) operations are conducted under IFR flight plans regardless of weather conditions (FLIP 1989). All entries and exits from an IR occur at published entry and exit points or alternate entry and exit points. SAC pilots must obtain a specific ATC entry clearance prior to entering the IR and an exit clearance prior to exiting the IR.

MTRs are used in the training of various low-level combat tactics. MTRs are established to alert pilots of military aircraft operations in excess of 250 KIAS. The MTR that would be used under the proposed action is IFR military training route IR-409. The IR-409 route corridor overlaps with several other MTRs: IR-177/501 and IR-110 between points C and G; IR-107 and VR-108 near Point E; IR-110 again at Point F; and IR-415 and VR-412/413 at Point G.

3.10.4 Controlled Area

Controlled areas include the airspace designated as federal airways, VHF omnidirectional range (VOR) federal airways, controlled areas associated with jet routes outside of the continental controlled area, and area low routes. The vertical extent of the various categories of airspace covered under controlled areas is defined under FAR Part 71. Controlled areas are depicted on Low Altitude Enroute, World Aeronautical, Sectional, and Terminal Area Control charts compiled and published by the National Oceanic and Atmospheric Administration (NOAA).

The airspace associated with controlled areas, in particular federal airways in which the corridor width is 4 statute miles to either side of the centerline and applicable altitudes are between 1,200 feet AGL and 18,000 feet MSL, frequently intersect low-level MTRs which, in turn, could range from a few hundred feet AGL to 10,000 feet MSL or above. Civil aircraft operating on federal airways under VFRs do not have to be in contact with the controlling ATC facility for that particular area. They can operate on these airways with no guidance by ATC. Therefore, VFR traffic could be unaware of scheduled military high-speed, low-level activity transiting through or alongside the federal airway in use. If civil VFR traffic were to transit through an active IR while flying within a federal airway, it could potentially create air safety problems. VFR aircraft which are in contact with the controlling ATC facility or with a FSS facility are advised of the military activity on the route. IFR aircraft are directed, either horizontally or vertically, away from active IRs to avoid potential conflicts with scheduled military aircraft on the route.

Low-level flight operations on IR-409 would cross beneath the following commercial flight corridors: V-81, V-169, and V-263, all between points E and F; V-210, V-389, V-19/83, between point F and G; and V-244 between point H and the Airburst Range.

3.10.5 Uncontrolled Airspace

Uncontrolled airspace is that portion of airspace that is not subject to the restrictions that apply to controlled airspace. The limit of uncontrolled airspace above urban areas is typically from the surface to 700 feet AGL. Above rural areas, uncontrolled airspace extends from the surface to 1,200 feet AGL. Uncontrolled airspace can extend above these altitudes to as high as 14,500 feet MSL, the base of the continental control area, if no other types of controlled airspace have been assigned. ATC does not have the authority to exercise control over aircraft operations within uncontrolled airspace. FAR Part 91 covers the regulations that must be followed by aircraft operating within this airspace. The extent of

uncontrolled airspace is typically dependent on its location in the United States. Areas associated with urban development or military facilities have less uncontrolled airspace than do areas with little urban development.

The primary user of uncontrolled airspace is VFR general aviation aircraft. An unknown but presumably large percentage of general aviation aircraft operate within uncontrolled airspace because of the lack of operational controls with which they must comply.

Two private airports are located beneath the IR-409 route: Two Buttes Reservoir Airport (near Point C) and Good Airport (near Point H) (refer to Figure 3.5-1). No public airports are located beneath the IR-409 route corridor. DOD FLIP guidance calls for military aircraft to avoid all charted airports by 3 NM horizontally or 1,500 feet AGL vertically whenever possible.

3.11 AIR SAFETY

Potential air safety hazards include collisions with birds or other aircraft. Possible ground hazards include danger to people or property from military bombing operations or aircraft mishap. The public's primary safety concern with regard to low-level training flights is fear of aircraft crashes (ORNL and Consultants, 1988).

3.11.1 Aircraft Collisions

The IR-409 route corridor overlaps with several other MTRs and is beneath several federal airways. In addition, private aircraft frequently operate in the area (refer to section 3.10, Airspace Management for details on airspace issues in the vicinity of IR-409 and the Airburst Range).

There have been no mid-air collisions associated with IR-409 or the Airburst Range. Two near-misses have occurred in approximately the last 10 years (personal communication, Dronenburg 1989). Each case involved a civilian aircraft flying to within 500 to 1,000 feet of an A-7 aircraft accessing the Airburst Range. One accident, in which a single A-7 collided with the ground, occurred approximately 2 miles west of the range within the Fort Carson boundaries. This accident was attributed to pilot error.

Civilian aircraft are not prohibited from flying within an MTR; however, extreme vigilance must be exercised when flying through or near these routes. Pilots should contact FSSs within 100 NM of a particular MTR to obtain current information on route usage, including times of scheduled activity, altitudes in use on each route segment, and actual route width (AIM 1989). Special operating procedures in the FLIP for IR-409 emphasize the "see and be seen" operating method.

At the mission level, the mission commander ensures that the aircrew is familiar with all appropriate procedures and available information before beginning a low-altitude flight. Flight publications are checked to determine if any specific considerations (such as airfields, population centers, sensitive wildlife areas, and unusual civilian air traffic such as forest service survey/fire detection flights) restrict flight activities. All flight plans are cleared by the local FAA ARTCC and no deviations from the flight plan are allowed without prior ARTCC approval (USAF 1988). Military aircraft engaged in low-level flight operations follow the same flight rules as civilian aircraft. The same 500-foot separation requirement for VFR operations and 1,000-foot separation requirement for IFR operations, the yielding of right-of-way to the aircraft least able to maneuver, and see-and-avoid rules apply to both civilian and military aircraft.

3.11.2 Ground Hazards

A primary ground hazard from the current activity at the Airburst Range is the potential for injury to persons in the vicinity of the range from aerial bombing and gunnery activities. The Fort Carson

Military Reservation is used extensively for ground maneuvers by U.S. Army battalions. Army troops often do tactical training (i.e., bivouacs) in areas very near the Airburst Range, particularly to the west and south. Infantry, tanks, and personnel carriers pass through the area regularly. In addition, many areas of the installation are open to hunters and fishermen by permit.

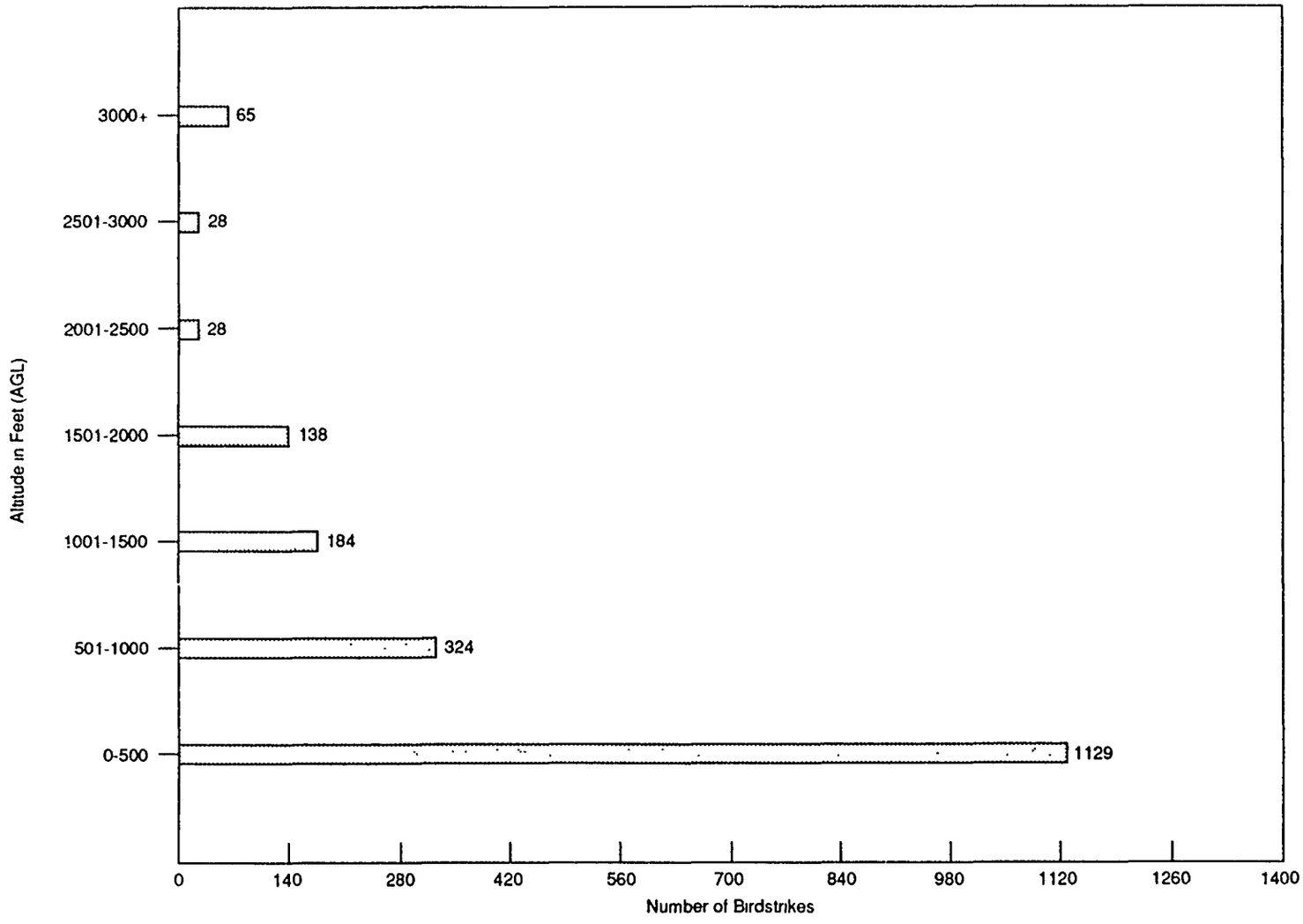
Fort Carson allows a safety fan of 2,265 acres surrounding the target area on the Airburst Range. As an added precaution, the Booth Gulch road northeast of the target area is closed when sorties are scheduled to use the range. While no injuries have occurred, the potential for early release of munitions or hung bombs are a concern to Fort Carson officials. Coordinated scheduling between Fort Carson and Airburst Range officials has mitigated the ground hazard to some extent. Army training maneuvers are restricted in the southern portion of the base when large numbers of sorties are scheduled. Fort Carson reports that activities associated with the Airburst Range cause very little inconvenience to Army training. Because the range generally schedules sorties 30 days in advance, the Army is able to schedule its training maneuvers 30 to 90 days in advance (personal communication, Markl 1989).

3.11.3 Bird Strike Potential

Birds can be encountered at nearly all altitudes. However, most birds fly close to ground level, and over 95 percent of all reported Air Force bird strikes are reported to occur below 3,000 feet AGL. Approximately half of these bird strikes occur in the airfield environment, and approximately one-quarter occur during low-level training (USAF 1988c). Figure 3.11-1 shows 1987 Air Force bird strikes by altitude. Strike rates rise substantially as altitude decreases. This is partly due to the greater number of low-level missions, but mostly because the birds are commonly active close to the ground. Any gain in altitude represents a substantially reduced threat of a bird strike.

Many bird strikes result in little or no damage to the aircraft. The most hazardous bird strikes occur when larger birds penetrate the windshield or canopy or are ingested in the engines. Table 3.11-1 shows the percentage of total bird strikes by impact location on the aircraft.

The bird strike potential is greatest in areas used as migration corridors (flyways) or where birds congregate for foraging or resting (e.g., open water bodies and wetlands). The lands under IR-409 are predominantly semiarid; however, the Arkansas River and several reservoirs north of the route attract large numbers of waterfowl (geese, ducks, and swans) and large wading birds (sandhill cranes and white pelicans), along with other smaller birds. In addition, birds of prey (turkey vultures and golden eagles) and migrating birds are common along the entire front range and in the vicinity of the Airburst Range. (See section 3.4, Biological Resources, for a detailed discussion of birds and other wildlife in the area.)



Source: HQ USAF/LEEVN, 1987.

Figure 3.11-1

1987 AIR FORCE BIRD STRIKES WORLDWIDE BY ALTITUDE

Table 3.11-1

Bird Strikes by Impact Location (1987)

Impact Point	*Percent of Total*
Windshield/Canopy	21.4
Engine Cowling	18.0
Radome/Nose	16.3
Wings	16.3
Fuselage	8.8
External Tanks/Pods/Gear	6.4
Multiple Locations	10.0
Other	2.3

Source: BASH Team, HQ USAF/LEEVN.

Birds of prey generally remain near or below 500 feet AGL, but they may go up to 2,500 feet AGL given the right thermals for soaring. They are most active between 1000 and 1600 hours, with peak activity near mid-morning, tapering off about noon, and peaking again in the mid-afternoon. Wading birds are most active in the morning and evening. They generally fly below 300 feet AGL, although they may fly higher (personal communication, Capt. R. DeFusco 1989).

Table 3.11-2 shows the number of bird-aircraft strikes recorded for IR-409 since 1975. While these numbers are extremely low, they may understate the actual number of bird-aircraft strikes because the exact location of the aircraft when the impact occurred may not be known. No similar data are available for the Airburst Range. However, according to the airspace manager for R-2601, the bird strike rate for the range is extremely low (personal communication, Krikorian 1989).

Table 3.11-2

Bird-Aircraft Strike History for IR-409
(through February 1988)

Date	*Number of Strikes*	*Altitude of Strike*	*Cost of Damage*
Sep 1986	1	100 feet AGL	0
May 1987	1	200 feet AGL	0
May 1987	1	200 feet AGL	0
Dec 1987	1	200 feet AGL	$1,700
TOTAL	4		$1,700

Source: BASH Team, HQ USAF/LEEVN 1989.

A Class A mishap (currently defined as an incident involving a fatality, loss of aircraft, or more than $1 million in aircraft damage) due to a bird strike occurred near La Junta, Colorado in 1987. In this case, a B-1B struck a white pelican during a high-speed low-level mission. The bird was presumably ingested into an engine, causing the plane to crash. White pelicans are known to congregate at Lake Meredith (personal communication, Merritt 1989).

The U.S. Air Force Bird-Aircraft Strike Hazard (BASH) team has developed a bird avoidance model (BAM) to predict the risk of hitting waterfowl and certain raptors, such as turkey vultures and broad-winged hawks, along any low-level route in the United States. The BASH team is in the process of incorporating other types of birds into the model as well. The BAM model is based on 40 years of waterfowl migration and wintering area data, coupled with longitudes and latitudes of all military low-level routes. The data include migration times, concentration densities, and movements of populations throughout North America. BAM graphs predict the bird strike potential at ranges and along MTRs with respect to time of day and month of the year. The graphs show the relative risk (number of bird strikes per one million NM of flight) of hitting waterfowl.

The BAM graph for IR-409 in Figure 3.11-2 indicates that aircraft using the route have a predicted risk of hitting, at most, fewer than 40 birds in one million NM of flight. The risk is highest from October through March, particularly during the morning and evening. These numbers reflect the low number of waterfowl and raptors in the immediate vicinity of the route, the fact that migrating birds tend to fly straight through rather than using the area as a stopping point for food and rest, and the low level of use of IR-409 relative to other MTRs. No BAM graph is available for the Airburst Range.

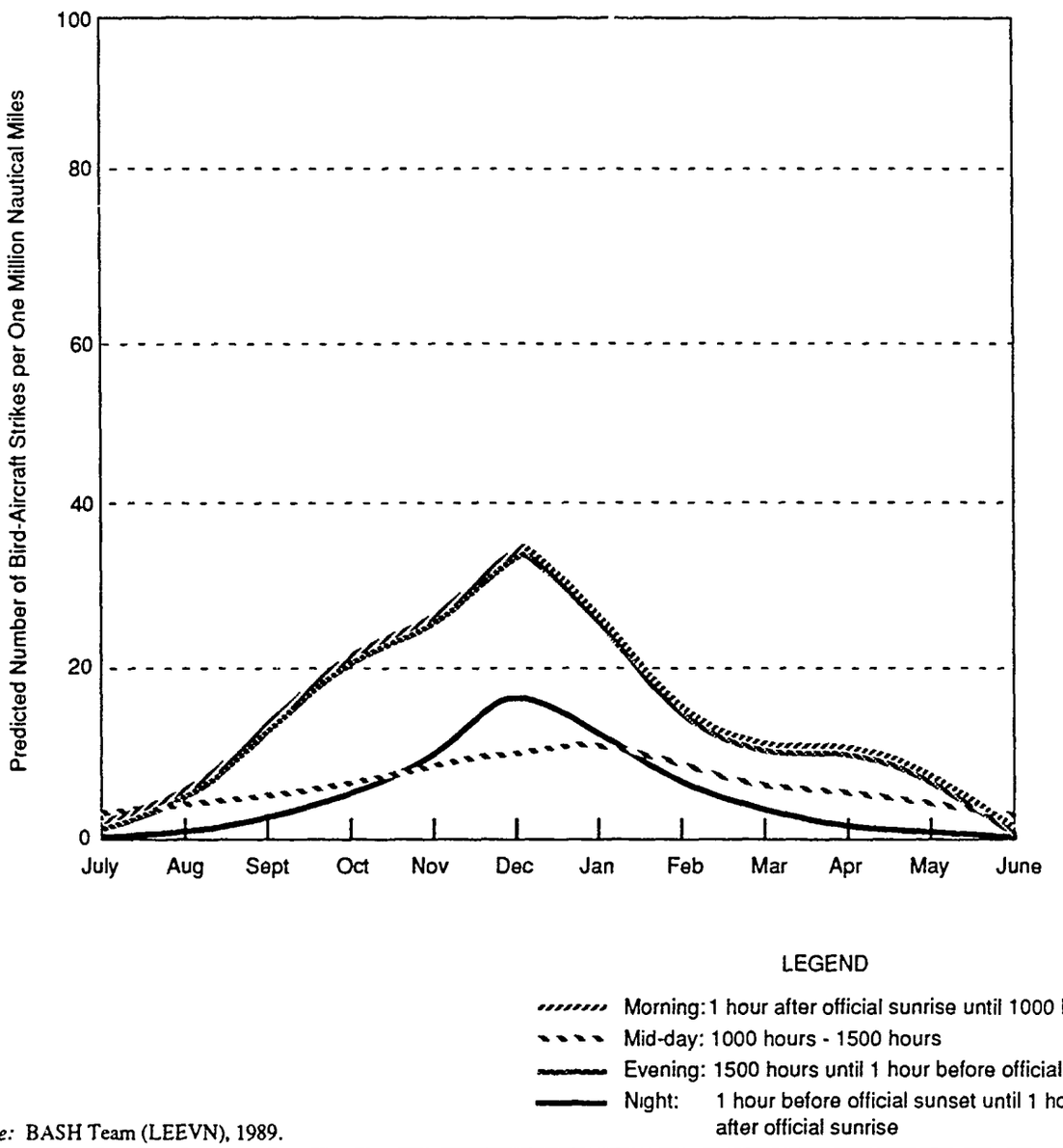
3.11.4 Military Planning and Procedures

ANG and Air Force Aircraft Crash Procedures

Initial response to an aircraft accident is the responsibility of the civilian authorities nearest the crash site. They provide emergency services such as fire, police, and medical assistance. They also notify the nearest military installation of the accident, who then notifies the nearest major ANG or Air Force installation.

Upon notification of the accident, the commanding officer of the nearest installation dispatches a Disaster Response Force (DRF) and notifies the ANG or Air Force unit that owns the aircraft involved. The DRF includes personnel from the following offices: disaster preparedness, security police, hospital, fire department, public affairs, legal, aircraft maintenance, munitions, mortuary, and others as required. The DRF assists in matters of site security, fire suppression, medical evacuation, accident evaluation and investigation, and protective measures such as munitions disposal and hazardous/toxic materials protective measures.

The ANG and Air Force have no specific rights or jurisdictions simply because government property is involved; civilian authorities retain control. Once emergency actions are completed, the National Transportation and Safety Board (NTSB) is notified if the mishap involved civilian aircraft. Otherwise, the military has primary responsibility for investigating an accident involving military aircraft. Once the accident investigation is complete, the ANG or Air Force either contracts for the cleanup of the accident site or dispatches civil engineering crews to perform the cleanup.



Source: BASH Team (LEEVN), 1989.

Figure 3.11-2

RISK OF BIRD-AIRCRAFT STRIKES FOR IR-409

4.0 ENVIRONMENTAL CONSEQUENCES

4.1 EARTH RESOURCES

The proposed action is expected to have no significant impact on earth resources. Overflights by SAC aircraft would have no effect on topography or soils beneath IR-409. SAC would use only inert, or nonexplosive, munitions at the Airburst Range and these would be dropped in existing target areas that have been used for this purpose for many years. The incremental increase in munitions delivery (and the probable increase in ordnance cleanup activities as a result) would increase soil disturbance in the vicinity of the targets, thereby increasing the potential for soil erosion and runoff. However, Fort Carson currently practices erosion control methods throughout the installation and within the range boundaries. The proposed action is not expected to significantly increase soil erosion and runoff on or near the range, nor affect current soil erosion control practices on Fort Carson.

While most ordnance dropped on the range can be recovered and disposed, a small portion shatters on impact or is buried in the soil. Ordnance debris from inert munitions is composed of innocuous materials (including concrete, cast iron, steel, tin, aluminum, and nylon from parachutes), most of which will eventually weather to inert hydrous oxides. Only very small amounts of residue from the phosphorous spotting charges in the practice munitions can be expected to remain on or within ordnance debris. Therefore, ordnance debris from inert munitions is not considered a source of soil contamination.

4.2 WATER RESOURCES

The proposed action would have no direct or significant impacts on water resources. The action does not require additional personnel who would increase local water demand or otherwise affect the availability or use of water in the project area. While increased munitions delivery at the Airburst Range can be expected to contribute to local soil erosion and silt loading, these impacts are and will continue to be mitigated by erosion control dams constructed as part of the overall land management program for Fort Carson (140th TFW 1977). Therefore, increased runoff as a result of SAC use of the Airburst Range is expected to be negligible. As described above, ordnance debris from inert munitions is composed of many innocuous materials. The potential for contamination of surface water or groundwater resources caused by leaching of inert ordnance debris is negligible.

4.3 AIR QUALITY

The proposed action would increase emissions of CO, THC, NO_x, SO_2, and PM within the study area due to SAC aircraft operations. The increase in annual bombing sorties within the project area for the B-1B and B-52 aircraft would be 2080 total sorties (1040 for each type aircraft). Emissions for one aircraft sortie and the total daily and annual emissions (measured in pounds and tons) associated with the proposed action are shown in Table 4.3-1.

A summary of the current and proposed total daily and annual emissions at the Airburst Range and training route IR-409 is provided in Table 4.3-2. As shown in Table 4.3-2, total daily aircraft emissions from the proposed action would be 0.79 tons of CO, 0.10 tons of THC, 1.22 tons of NO_x, 0.18 tons of SO_2, and 0.18 tons of PM. Total annual emissions from the proposed action would be 205.5 tons of CO, 24.5 tons of THC, 31.9 tons of NO_x, 47.9 tons of SO_2, and 46.9 tons of PM These levels represent the following percentage increases in daily emissions from current aircraft activity levels: 520.1 percent for CO; 927.6 percent for THC; 174.8 percent for NO_x; 414.0 percent for SO_2; and 575.8 percent for PM. The percentage increases in annual emissions are 1,451.1 percent for CO, 1,940.6 percent for THC, 214.1 percent for NO_x, 606.9 percent for SO_2, and 961.6 percent for PM.

Table 4.3-1

AIRCRAFT EMISSIONS ASSOCIATED WITH PROPOSED SAC USE OF AIRBURST RANGE AND RACETRACK AND IR-409[1]

	----- POUNDS OF EMISSIONS/SORTIE -----				
Aircraft	*CO*	*THC*	*NO_x*	*SO_2*	*PM*
Airburst Range and Racetrack					
B-1B	190.5	10.0	57.6	25.0	0.5
B-52	25.9	9.1	152.3	15.2	26.4
IR-409					
B-1B	116.9	6.2	35.4	15.4	0.3
B-52	61.9	21.8	364.1	36.4	63.0
	---------- TONS OF EMISSIONS ----------				
	CO	*THC*	*NO_x*	*SO_2*	*PM*
Airburst Range and Racetrack					
Proposed Daily Emissions	0.43	0.04	0.42	0.08	0.05
Proposed Annual Emissions	112.51	9.97	109.16	20.94	13.97
IR-409					
Proposed Daily Emissions	0.36	0.06	0.80	0.10	0.13
Proposed Annual Emissions	92.96	14.56	207.73	26.92	32.93
TOTAL PROPOSED DAILY EMISSIONS	0.79	0.10	1.22	0.18	0.18
TOTAL PROPOSED ANNUAL EMISSIONS	205.47	24.53	316.90	47.86	46.89

Note: 1. Current baseline emissions for Airburst Range and IR-409 are presented in Table 3.3-2.

Table 4.3-2

INCREASED EMISSIONS ASSOCIATED WITH PROPOSED
SAC USE OF AIRBURST RANGE AND RACETRACK AND IR-409

Emissions	TONS OF EMISSIONS				
	CO	*THC*	*NO_x*	*SO_2*	*PM*
DAILY					
Total Current Emissions	0.15	0.01	0.70	0.04	0.03
Total Proposed SAC Emissions	0.79	0.10	1.22	0.18	0.18
Percent Increase	520.1%	927.6%	174.8%	414.0%	575.8%
ANNUAL					
Total Current Emissions	14.16	1.26	148.00	7.89	4.88
Total Proposed SAC Emissions	205.47	24.53	316.90	47.86	46.89
Percent Increase	1451.1%	1940.6%	214.1%	606.9%	961.6%

To estimate site-specific impacts on ambient pollutant levels that would result from project aircraft emissions, a closed-box modeling technique was used. This technique assumes that aircraft emissions (measured in ug/m^3) are homogeneously dispersed and contained within a given volume of air in which an aircraft operates. As a result, the pollutant concentration calculated within the box is assumed equal to the maximum ground-level impact. The closed box technique is expected to estimate higher ground-level impacts than an analysis utilizing a computerized dispersion model due to the conservative assumptions used in this approach. For example, the aircraft emissions are assumed to remain confined within the limited airspace of the closed box instead of being allowed to disperse downwind throughout a much larger volume of air, as would occur naturally.

Since a proposed aircraft sortie typically involves an approach and three passes around a racetrack course through the Airburst Range at subsonic speeds and at heights as low as 400 feet AGL, air traffic and resulting aircraft emissions will be the greatest in the area of the racetrack and range. The analysis therefore focuses on impacts in the vicinity of the Airburst Range. If impacts are determined to be insignificant within the range, impacts will also be insignificant within the remainder of the study area.

The airspace assessed is assumed to be a segment of the racetrack passing through the Airburst Range. The lateral and vertical extension of this racetrack segment, within which aircraft emissions are dispersed, is assumed to be a square, with each side equal to twice the flight path height AGL (i.e., 2 by 400 feet). An aircraft is assumed to pass through this same airspace each time around the racetrack. To assess the most likely worst-case emissions scenario, three daily B-52 sorties were assumed to follow this flight path within the same hour. Three is the most likely maximum number of sorties which will occur in one hour, and the B-52 emission factors (in pounds per mile) are higher than the B-1B emission factors for all pollutants with the exception of CO. (The B-1B travels approximately 339 NM over the range and racetrack area during a sortie, while the B-52 travels only 87 NM due to its shorter turn radius. The B-52 emission factor [in pounds per mile] for CO is therefore approximately one-half the value of the B-1B CO emission factor. All other B-52 emission factors are much greater than the B-1B emission factors.) A conservative analysis is therefore performed by assuming that emissions from these three B-52 sorties impact the same airspace or ground-level location within the same hour.

Modeled one-hour impacts are compared to NAAQS with averaging periods longer than one hour by converting the one-hour impacts to longer averaging periods with the use of power laws. This technique is consistent with that recommended by the EPA (EPA 1977). The factors used to convert one-hour impacts to longer averaging periods are as follows: 0.90 for three-hour impacts, 0.70 for eight-hour impacts, 0.40 for 24-hour impacts, and 0.10 for annual impacts.

To estimate total impacts of the proposed action, concentrations of atmospheric pollutants predicted to result from the project are added to background pollutant values assumed to be characteristic of the project area. Background concentrations of PM_{10} are conservatively estimated as equal to the highest PM_{10} value measured in Pueblo, Colorado (CDOH 1989). Monitored background data for NO_2 and SO_2 do not exist from anywhere within the project area because all areas of Colorado and New Mexico are in attainment for these pollutants. Background concentrations of NO_2 and SO_2 are therefore conservatively estimated as equal to one-half of the NAAQS. Likewise, background data for CO are not available which are representative of the project area. The nearest CO monitor located in Colorado Springs represents high urban concentrations which would not be typical of the rural project area. The CO background concentrations for the project area are therefore also estimated as equal to one-half of the NAAQS.

The total project plus background pollutant concentrations are compared to the NAAQS to determine if significant impacts would occur. The results of the impact analysis are presented in Table 4.3-3. At most, the proposed aircraft sorties would increase one-hour ground-level pollutant concentrations by 3.7 ug/m^3 for CO, 1.3 ug/m^3 for THC, 21.7 ug/m^3 for NO_x (assumed to be 100 percent NO_2), 2.2 ug/m^3 for SO_2, and 3.8 ug/m^3 for PM (assumed to be 100 percent PM_{10}). The total pollutant impacts

Table 4.3-3

AIR QUALITY MODELING RESULTS FOR THE SAC PROPOSED ACTION AT THE AIRBURST RANGE AND RACETRACK AND IR-409 (ug/m^3)

Pollutant	*Averaging Time*	*Proposed Action Impact*	*Background Concentration*[1]	*Total Impact*	*NAAQS*	*Percent of NAAQS*[2]
Carbon monoxide	8-hour	2.6	5,000.0	5,002.6	10,000	50.0%
	1-hour	3.7	11,500.0	11,503.7	23,000	50.0%
Nitrogen dioxide	Annual	2.2	50.0	52.2	100	52.2%
Sulfur dioxide	Annual	0.2	40.0	40.2	80	50.0%
	24-hour	0.9	182.5	183.4	365	50.2%
	3-hour	2.0	650.0	652.0	1,300	50.2%
PM_{10}	Annual	0.4	35.0	35.4	50	70.8%
	24-hour	1.5	71.0	72.5	150	48.3%

Notes:

1. Background pollutant concentrations for CO, NO_2, and SO_2 are assumed equal to one-half the NAAQS (refer to discussion in Section 4.3). Background concentration for PM_{10} is equal to highest value measured in Pueblo, Colorado (CDOH 1989).
2. The proposed action would be expected to have a significant impact on air quality if the total emissions for any of the listed pollutants were 100 percent or more of the NAAQS.

(proposed action impact plus background) are well below the NAAQS in every case. Therefore, the proposed action will have an insignificant impact on air quality within the project area.

To accurately determine the impact of the project aircraft emissions on ambient ozone, a rigorous photochemical analysis would be required. The conservative impact analysis presented for the proposed aircraft activities determined that the one-hour ground-level concentrations of ozone precursors (photochemically reactive hydrocarbons [which for aircraft is approximately 95 percent of the THC] and NO_x) will increase only marginally. Under favorable conditions, a few hours are required to convert ozone precursors to ozone in the atmosphere. Given that the project emissions of ozone precursors generated by the proposed action are intermittent and that an extended residence time in the atmosphere is required to convert these emissions to ozone, ground-level increases in ambient ozone from the proposed action will be small, if not unmeasurable.

The impact of project aircraft emissions on visibility is an issue with regard to federally mandated Class I areas such as national parks and wilderness areas. The Great Sand Dunes National Monument is the nearest Class I area in proximity to the study area (about 30 miles southwest of IR-409 at the nearest point). The potential exists for SAC aircraft to impair visibility, defined as (1) a reduction in regional visual range and (2) temporary atmospheric discoloration or plume blight. There are no readily available quantitative techniques to estimate visibility impacts from inflight aircraft, as most techniques apply to stationary, ground-level emission sources. The results of the impact analysis determined that the proposed aircraft sorties would minimally increase air pollutants. This indicates that regional visibility reductions from the proposed action would also be minimal. Plume blight would occur within an aircraft flight path, but only for a short time period immediately after passage of the aircraft. Impacts on visibility within Class I areas from the proposed action would therefore be insignificant.

4.4 BIOLOGICAL RESOURCES

4.4.1 Vegetation and Wildlife

Under the proposed action, SAC aircraft would use IR-409 and the Airburst Range in approximately the same manner as current aircraft, with the same types of impacts on biological resources. Impacts on biological resources due to the proposed action are expected to be limited to increased noise and visual disturbance to wildlife and potential aircraft collisions with migratory birds. Increased munitions delivery at the Airburst Range target area would have minor effects on vegetation and wildlife present in the area. Current weapon use and weapon safety footprints are discussed in section 4.7.1. The target areas have been used for many years and it is unlikely that any appreciable vegetation still remains in the area, although a brief inspection of the target area would be required to confirm this. Some inert ordnance could land on rodents, rabbits, or lizards, but the expected level of mortality would have negligible effects on their populations.

Areas that lie under existing special use airspace at the Airburst Range and along IR-409 would experience an increase in overflight episodes. The proposed action would result in a 66-percent increase in the number of sorties flown per year on the Airburst Range; a 76-percent increase on IR-409 from Point G to the range; and an 867-percent increase (from less than 1 sortie per day to approximately 7 or 8 per day) from Point A to Point G (see Figure 1.2-1). The proposed minimum AGL for IR-409 is 400 feet AGL, extending from Point C to Point G. All other proposed above ground flight levels for aircraft along the route would be higher and are discussed in detail in section 2.1.1.

Recent reviews (Gladwin et al. 1987; Manci et al. 1988) have established the potential sensitivity of wildlife to the noise and visual stimuli associated with aircraft flying at low altitudes. Evidence suggests that for most species impacts on behavior are minor (e.g., Lamp 1989; Shotton 1982) and do not negatively affect reproduction. Some species, however, have exhibited strong adverse reactions to low-flying aircraft and may be considered sensitive (Lamp 1989). Although wildlife populations appear to

thrive in many areas subject to aircraft overflight (Shotton 1982), long-term effects of aircraft activity on animals are largely uncertain and no conclusions can be drawn regarding these effects (Lamp 1989). Additionally, there are few data, if any, on the responses of wildlife populations to large increases in the frequency and intensity of aircraft activity in their habitat. The primary wildlife species that could be affected at the Airburst Range and along IR-409 are mule deer, pronghorn, raptors, waterfowl, and certain threatened and endangered or federal candidate bird species. Responses of some of these species to aircraft overflights as presented in Lamp (1989) and the potential for impact as a result of the proposed action is presented below.

Noise and visual impacts from aircraft appear to constitute temporary, nonthreatening disturbances to which resident wildlife often become accustomed (CH2M HILL and Consultants 1988). Mule deer exhibit minor, short-term reactions to low-level overflights, minor impact (Lamp 1989). Pronghorn are not known to be particularly sensitive to jet aircraft activity. No significant impacts to these species would be expected from the proposed action.

Bighorn sheep are known to be sensitive to noise and visual intrusion, and are more vulnerable to disease when under stress. Monitoring of bighorn sheep responses to military aircraft in Nevada (Lamp 1989) has not produced conclusive results. Observations of bighorn sheep responses to low-level jet overflights (about 400 feet AGL) in Idaho have indicated that some exhibit a panic response (i.e., some ran 0.5 mile to the bottom of the canyon and continued running for some distance in the canyon) while others apparently ignored the aircraft (personal communication, L. Oldenberg 1989). The type of response may be related to the habitat type occupied by the sheep when the overflights occurred. The extent to which canyon-dwelling bighorn sheep can become accustomed to military aircraft disturbance is unknown. Experience in mountainous habitat on both the Nellis AFB and Luke AFB ranges indicates the existence of healthy bighorn sheep populations in restricted access areas that are subjected to frequent low-level jet overflights.

With implementation of the proposed action, the magnitude and frequency of noise and visual disturbance will increase greatly over three areas where bighorn have recently been reintroduced. Approximately 100 head are present in the Purgatoire River canyon area, where the most recent (1982) reintroductions were made. This population is believed to be increasing (personal communication, M. Elkins 1990). About 45 head are present in the West Carrizo area, and 75 head are present in Apishapa Canyon. The status of these populations is unknown, but they are believed to be stable (personal communication, M. Elkins 1990). Because of the lack of much prior overflight activity in this area, bighorn in this area may not be accustomed to repeated overflights, and it is conceivable that their continued range expansion could be retarded or delayed, thus conflicting with CDOW's goal of maximizing the bighorn population in the state. This could result in significant impacts on bighorn sheep populations. Production areas, which are located roughly one, five, and ten miles from the centerline of IR-409, would be most sensitive. The potential for impacts could be subsantially reduced by avoiding overflights in reintroduction areas or by raising the minimum AGL over these areas. Since noise levels for B-52s and B-1Bs at 1,500 feet are reduced to 85 dBA and 104 dBA, respectively, this altitude is recommended. The following Special Operating Procedures should thus be implemented: (1) Between points D and E, pilots should fly 5 miles north of the centerline, or raise their altitude to 1,500 feet AGL; (2) between points E and F, pilots should fly directly on or south of the centerline, or, if north of the centerline, maintain 1,500 feet AGL in the vicinity of the Purgatoire and Chacuaco river canyons; and (3) the Air Force could also initiate a program to monitor the reactions of bighorn sheep herds to their proposed activity. With the implementation of these procedures, it is not likely that the proposed action would adversely affect bighorn sheep.

Nesting raptors are disturbed by low-level flight activity, but no reproductive failure was observed by Lamp (1989) in Nevada. Minor disturbance reactions consisted of watching the aircraft as it passed overhead. In one case, a low overflight by a helicopter provoked flushing from the nest for more than two hours. Other studies (Ellis 1981; Holthuizen 1989) suggest that raptors would not be significantly affected by disturbance from overflights. Andersen (in press) compared the behavioral response to

low-level helicopter flights of nesting red-tailed hawks in areas where air traffic had recently been initiated (Pinon Canyon Maneuver Site [PCMS]) to areas where such traffic has occurred for an extended period (Fort Carson Military Range [FCMR]). Red-tailed hawks nesting at PCMS exhibited stronger avoidance behavior than did hawks nesting at FCMR. Most nests subjected to the overflights successfully fledged young, however. Evidence indicates, then, that it is not likely that reproductive failure would occur; however, if disturbance from overflights were to result in reproductive failure, impacts could be significant, depending on the species affected. Significant impacts are not likely at the Airburst Range given the current extensive military use of Fort Carson and the lack of sensitive raptors in the immediate vicinity of the range (personal communication, S. Emmons 1989). However, golden eagles, ferruginous hawks, and Swainson's hawks are known to nest in areas along IR-409 (e.g., in the PCMS) where the greatest increase in flights is anticipated. USFWS has indicated (personal communication, B. Rosenlund 1989) that overflights at 400 feet AGL over the PCMS may cause raptors to flush from nests. However, since available data suggest that reproductive failure would not occur, and since golden eagles, red-tailed hawks and other raptors are rather abundant in the area, impacts are not considered significant. Ferruginous hawks, bald eagles, and peregrine falcons are discussed below.

Migrating and nesting waterfowl are particularly sensitive to noise (Ellis 1981; ORNL and Consultants 1988). Birds concentrating at reservoirs and lakes could be sensitive to low-level jet training activities, if such activities were new to the area. According to Lamp (1989), certain nesting waterfowl tolerate low-level overflights, while some migrant visitors (e.g., green-winged teal, snow geese, pintail) are sensitive. Many resident shorebirds and waterbirds are generally tolerant of su·h activities. The potential for impact would be greatest in these areas in the spring and fall when most migrating birds are present. Under the proposed actio·., aircraft would fly at about 6,000 feet AGL over the Arkansas River near Point A. Aircraft at this altitude are not likely to affect waterfowl in the area. There are no other waterfowl concentration areas in the study area.

Collisions of birds with military aircraft are possible and, in fact, have occurred in the study area (personal communication, D. Lovell 1989). Four bird strikes were recorded on IR-409 between 1986 and 1988 (see Table 3.11-2). No comparable data are available for the Airburst Range. In general, the bird-aircraft potential for the range and route is very low relative to other parts of the United States. According to bird avoidance models (BAMs) developed by the U.S. Air Force, the risk of colliding with birds is highest in December, when daily and seasonal migrations and movement patterns in the area reach a peak (see Figure 3.11-2). At this time aircraft using IR-409 have a predicted risk of hitting, at most, fewer than 40 birds in one million NM of flight. This risk decreases to its lowest point during June, July, and August, when the predicted risk of hitting a bird is less than 2 birds in one million NM of flight. Based on the proposed use (173 sorties per month), the length of the route (207 NM), and the bird avoidance model, these figures translate to about 6 bird strikes per year, which would be inconsequential to waterfowl populations considering the amount of waterfowl in the area. (Bird avoidance models are based primarily on waterfowl, although the Air Force is revising its database to include other bird species.) While the proposed action would increase the possibility of bird strikes on IR-409 and at the range, it is not likely that incidental strikes would affect the survival of any particular species. Therefore, only minimal impacts are expected. Bird strike data and safety implications for the Airburst Range and IR-409 are presented in greater detail in section 3.11, Air Safety.

4.4.2 Threatened and Endangered Species

Specific consideration was given to identifying potential effects on threatened or endangered species as identified by the Golden, Colorado office of USFWS (letter from L. Carlson, January 1989). Wintering bald eagles and migrating peregrine falcons, both listed as endangered, are the two primary species of concern, although other species that are candidates for listing are also considered.

As discussed above, noise and visual disturbance from aircraft flying at low altitudes may startle wildlife. Wintering and nesting bald eagles are sensitive to overflights and other noise and visual

disturbances (Stalmaster 1987; Lamp 1989). Although the bald eagle is not known to nest in this area, two known winter concentration areas are located beneath the corridor of IR-409: one along the Arkansas River immediately south of the range, another along West Carrizo Creek on Black Mesa. Since the Arkansas River location is crossed by aircraft flying at 1,000 feet AGL in a perpendicular fashion, and is currently exposed to aircraft overflights, the 76-percent increase in low-level overflights proposed for this segment of the route is not expected to cause significant impacts. The large projected increase in the number of sorties on IR-409 (from an average of one per day to 7 or 8 per day) near the West Carrizo Creek location (immediately south of point D and roughly coincidental with the bighorn reintroduction area) could result in bald eagles avoiding this wintering area. However, if the standard operating procedures for bighorn sheep are implemented, any adverse impacts would be avoided.

Some data suggest that nesting peregrine falcons are not sensitive to aircraft noise (Ellis 1981). A recent study (Holthuizen 1989) conducted on prairie falcons along the Snake River concluded that blasting and construction activities were not likely to significantly affect prairie falcons, and the author suggested that the results could legitimately be extrapolated to peregrine falcons. As with other raptors, nesting would be the most sensitive time period. Although peregrine falcon nesting areas are located beneath the IR-409 corridor (along the St. Charles and Huerfano rivers in Pueblo County), These locations are overflown at 1,000 feet AGL. No significant impacts are anticipated. Because the peregrine is not known to nest in the vicinity of the Airburst Range, and is a relatively transient species, impacts of low-level overflights are not expected to cause detrimental effects at the Airburst Range.

It is not likely that use of the Airburst Range would cause any additional impacts to resident or migratory threatened, endangered, or candidate species that are already exposed to such activity. However, candidate species such as the long-billed curlew, mountain plover, and ferruginous hawk breed in the area, and the additional number of sorties along IR-409 could affect these species, if nesting sites were located beneath the route corridor.

Collisions of threatened, endangered, or candidate bird species resulting from SAC flight operations along IR-409 or at the Airburst Range are possible, but highly improbable. SAC would adopt flight restrictions as deemed necessary by the USFWS to ensure that the proposed action does not adversely affect threatened or endangered species.

Little evidence exists regarding the sensitivity of mammals such as the black-footed ferret (federally listed as endangered) and the river otter (state listed as endangered) to aircraft noise. However, these species are unlikely to exist in the study area. No impacts are expected.

Although a brief (one-day) springtime inspection of the target area would be required to definitely establish the presence of any federal candidate plant species that may be affected by bombing, in all likelihood these locations do not contain sensitive species because of the history of previous target use and decontamination. If sensitive species do exist in areas that might be affected, impacts could easily be avoided by reconfiguring the target(s).

4.5 LAND USE

Land use impacts would result primarily from noise associated with low-flying aircraft, which could preclude or disrupt the designated use of an area in the vicinity of IR-409 or the Airburst Range. The projected increase in noise levels as a result of the proposed action are described in detail in section 4.8, Noise. Potential noise impacts on residential areas are discussed in section 4.9, Socioeconomics.

4.5.1 Recreation

L_{dn} values above 65 dB are generally not compatible with recreational land uses (refer to Table 3.8-2). As shown in Table 4.8-1, the proposed action is expected to increase L_{dn} values to 65 dB or higher along some portions of IR-409. These noise levels would occur directly beneath the route centerline

and would be attenuated to 65 L_{dn} approximately 3,000 feet on either side of the centerline. Noise levels directly beneath the B-52 racetrack would remain well below 65 L_{dn}.

Given the relatively low current level of use on IR-409, particularly from Point A to Point G, the proposed action would result in a perceptible increase in noise beneath the route centerline and at the Airburst Range. However, SAC training activities would take place primarily on weekdays, minimizing the potential impacts on recreation areas, which typically receive the heaviest use on weekends. The most sensitive recreation area identified in the vicinity of the route and the range is the San Isabel National Forest. The IR-409 corridor overflies a very small portion of the forest just west of Point H. This area does not lie beneath the route centerline and would experience noise levels well below 65 L_{dn}. Therefore, impacts of the proposed action on recreational use of the forest are expected to be negligible.

4.5.2 Nationally Protected Lands

The maximum noise level beneath IR-409 between points B and G, where the route overflies large portions of the Comanche National Grassland, is projected to be 65 L_{dn} (refer to Table 4.8-1). This level is compatible with all agricultural and livestock activities, which is the predominant land use within the grassland. It is marginally compatible with recreational use, and is not expected to significantly impact hunting and fishing in the area. Potential noise impacts on domestic animals are discussed below.

Noise levels at the state wildlife areas in the vicinity of the route and at the San Isabel National Forest are expected to remain well below 65 L_{dn}, a level compatible with all established land uses. While individual overflights could prove annoying to some recreational users of these areas, overall impacts would not be significant.

4.5.3 Noise Impacts on Domestic Animals

There is no evidence to suggest that domestic animals in the agricultural areas that would be overflown would experience long-term adverse physiological effects (Manci et al. 1988; ORNL 1988). The projected L_{dnmr} would in no instance exceed 70 dB (or an L_{dn} of 68 dB) directly under the route centerline (refer to Table 4.8-1). This worst-case impact represents a moderate increase over the current level of 65 L_{dnmr} (or 62 L_{dn}). Under the ANSI standards, livestock farming and breeding are fully compatible with noise levels up to 65 L_{dn} and are marginally compatible up to 75 L_{dn}.

A number of both short-term and long-term studies of aircraft noise effects on poultry, cattle, sheep, pigs, and horses have been conducted (Stadelman 1958; Parker and Bayley 1960; Bond et al. 1963; Casady and Lehmann 1967; Nixon et al. 1968; Espmark et al. 1974; Anderson 1987). There has been no evidence of reduced production as a result of military jet training flights. Temporary startle reactions to overflights have been observed in some animals, and these types of reactions entail some possibility of animals injuring themselves or each other if they are in close confinement (Shotton 1982). If these types of reactions were to occur or if farming activities were disrupted, the area could be classified as noise-sensitive. SAC and ANG policy is to avoid overflight of noise-sensitive areas through lateral separation. With this standard procedure in place, it is expected that potential impacts on livestock in the vicinity of IR-409 and the Airburst Range would be minimal.

4.6 VISUAL RESOURCES

The nature of a visual impact is dependent upon the sensitivity of the resource affected, the distance from which aircraft are viewed, the number of times they would pass by a given area, and the estimated length of time they would be visible. Aircraft are transitory, not permanent, fixtures in a landscape. At most, the visual effects of SAC aircraft on sensitive receptors would be brief (approximately 4 to 5 seconds) and would not be considered significant. Figure 4.6-1 provides a scaled simulation of B-52

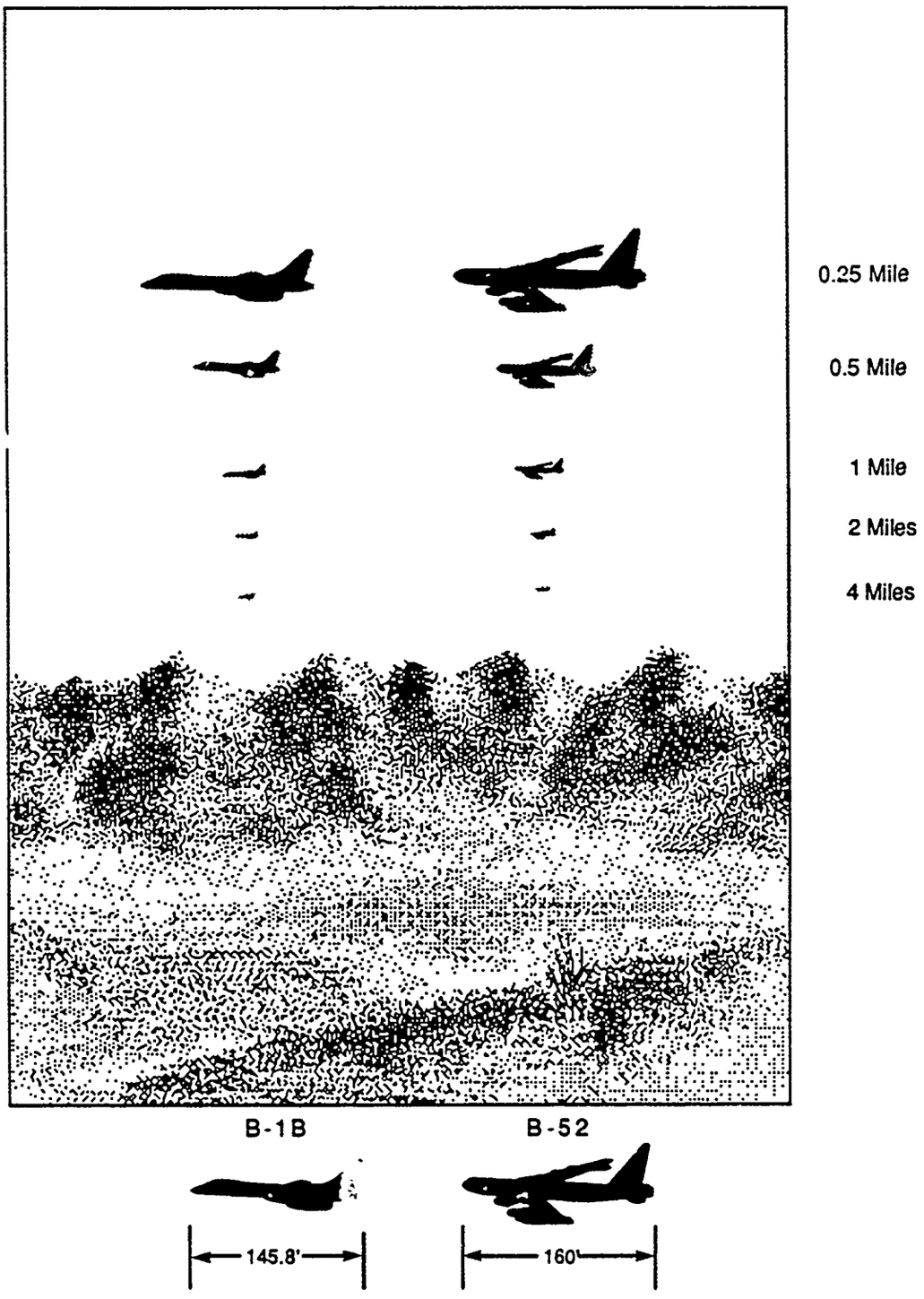


Figure 4.6-1

VISUAL IMPACTS OF B-52s AND B-1Bs AT VARYING DISTANCES FROM THE VIEWER (500 FEET AGL)

and B-1B aircraft passing at 500 feet AGL over terrain representative of that under IR-409 and in the vicinity of the Airburst Range (distances are given in statute miles). Impacts on visual resources due to overflights of SAC aircraft would not be mitigated by screening from vegetation or topography in the study area. However, given the sparse population beneath the IR-409 corridor and in the vicinity of the range, the proposed action is not expected to significantly impact visual resources in the study area.

4.7 CULTURAL RESOURCES

Impacts to cultural resources primarily occur as a result of actions that disturb the ground surface or increase the potential for unauthorized artifact collection or vandalism of archaeological and historical sites. Actions within a bombing range that can create such impacts include the construction of new roads to new targets, firebreaks, associated facilities, direct impacts of inert and live munitions, and vehicular travel and other activities associated with removing spent munitions from the range ("decontamination"). Increased human presence and access to cultural resources also can allow collectors and vandals to deplete the archaeological and historical record, a non-renewable resource. However, the proposed action does not include the construction of new roads, firebreaks, or other facilities and the project will not increase human presence in the area. Potential impacts at Fort Carson are limited to direct impacts of inert bombs and impacts due to decontamination.

Precisely defining the impacts of increased delivery training using existing targets first requires identifying the area of potential impact; the type and extent of expected ground disturbance; and the scientific, historical, or cultural significance of sites located in the potential impact area. Air Force weapon safety footprints indicate that the maximum area of potential impact measures 0.4 by 3.2 miles; however, recent archaeological reconnaissance surveys conducted on other ranges indicate that virtually all disturbance is limited to areas within 250 to 300 meters of specific targets (USAF 1988, USAF 1989). Cultural resources within this radius of a target have a relatively high probability of being affected by bombing impacts. Resources beyond this distance would rarely, if ever, be disturbed.

Ground disturbance associated with the proposed action would result from the impacts of nonexplosive practice munitions ranging in weight from 5 to 531 pounds. The larger bombs have the greatest potential for affecting cultural resources. Although bomb impacts vary from area to area, recent data gathered from the Saylor Creek Range in Idaho and the Superior Valley and Leach Lake ranges in California are generally applicable. Field inspections and interviews with decontamination (cleanup) personnel at these ranges indicate that heavy practice munitions like the BDU-50 (531 pounds) can cause extensive ground disturbance. On rare occasions, for example, the BDU-50 can bury itself 20 to 30 feet deep or can skip over the ground surface for 2 to 3 miles depending on the soil type, soil moisture, and ground cover. A single BDU-50 can enter, exit, and reenter the ground with what has been described as a "porpoise" action. However, the average BDU-50 disturbs an area measuring about 8 by 3 by 3 feet.

The lighter-weight inert bombs that SAC proposes to use, the 10-pound BDU-48 and the 25-pound BDU-33, will result in much less ground disturbance than described above. For example, archaeological reconnaissance data indicate the flat-nosed BDU-48 usually penetrates only 3 to 4 inches into the ground, while the heavier and more projectile-shaped BDU-33 normally disturbs a larger area measuring about 1.5 by 1.5 by 1.0 feet (USAF in progress).

SAC proposes to fly 2,080 sorties per year and drop an annual total of 6,240 inert bombs on the range (assumes 3 passes per sortie and one bomb per pass). This represents a substantial (66 percent) increase compared to current operations. Figure 4.7-1 illustrates the locations of cultural resource sensitivity zones, and specific target locations surrounded by a 300-meter radius that is assumed to represent the potential zone of impact from bomb impacts. Although all targets are located within a zone of low sensitivity, the 300-meter zone of expected disturbance overlaps the zone of high sensitivity that flanks Booth Gulch. However, the sensitivity of this zone is inferred from other ares of Fort

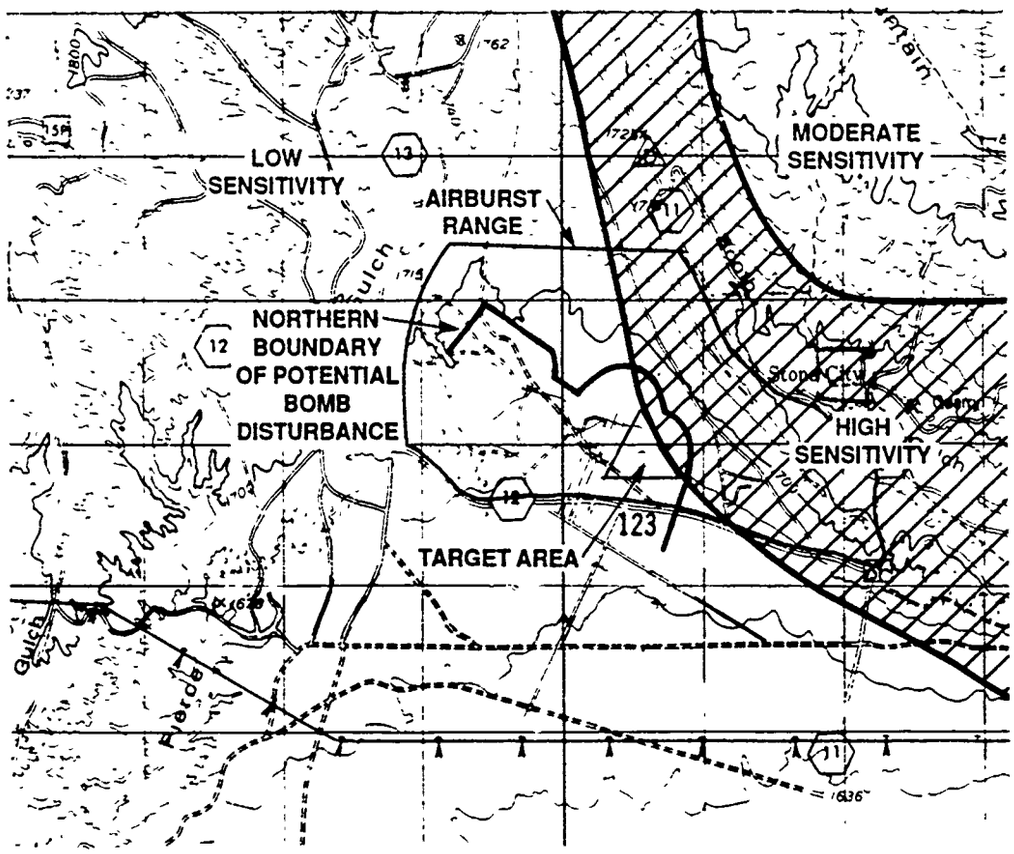


Figure 4.7-1

RELATIONSHIP OF POTENTIAL BOMB DISTURBANCE AND THE ZONES OF HIGH ARCHAEOLOGICAL SENSITIVITY ADJACENT TO THE AIRBURST RANGE

Carson. Actual survey of Airburst Range and adjacent areas suggests that areas that would be affected by increased bombing and contamination (cleanup) activities contain only isolated prehistoric artifacts or remains of stock tanks and other minor remains of cattle grazing operations. In fact, given that the proposed action will increase the use of existing targets, it is highly likely that the project will affect areas that have been previously disturbed. This level of high disturbance, coupled with the expected lack of significant types of resources, indicates that the proposed action will not significantly affect cultural resources.

Vibrations from low-flying aircraft are not expected to affect cultural resources because (a) speeds will be subsonic, (b) very little flying will be conducted at altitudes less than 1,000 AGL (Battis' 1988 report on overflight experiments conducted to determine effects of low-level flight vibrations on a 1,000-year-old prehistoric structure indicates that significant impacts to sites from B-52s and similar aircraft are "extremely unlikely" at altitudes above 400 feet AGL). Furthermore, the types of structures that can be damaged at lower altitudes (i.e., standing structures with a significant amount of mortar or plaster that can be cracked by vibrations) have not been reported from the base (Centennial Archaeology 1987) and are assumed rare or nonexistent in adjacent areas.

4.8 NOISE

The proposed action was modeled for noise impacts along IR-409 and at the Airburst Range using the ROUTEMAP program as described in section 3.8. The results of this modeling are presented below.

4.8.1 Airburst Range

SAC activity is expected to increase range operations by about 66 percent above current levels by adding 2,080 sorties per year to the 3,130 sorties currently flown. Since all aircraft normally make several passes over the range per sortie, the number of overflights in the range area, and the associated noise, would actually be much higher than these sortie numbers indicate.

A variety of complex training operations occur daily at Airburst range and in the surrounding areas within Fort Carson. For example, A-7 and F-16 aircraft stay within the target area on the range at all times, circling around at many different altitudes for 20 to 30 minutes each. Similarly, F-111 aircraft, after completing an average of four level passes over the range, typically make as many as eight more diving passes varying from 100 to 3,000 feet AGL. During these maneuvers, and while on the range, the aircraft are not restricted to any particular racetrack pattern. Helicopter activity is similarly unrestricted. As a result of this complexity in training operations, noise levels within the Fort Carson boundaries cannot be accurately modeled.

While the proposed action can be expected to increase the average noise levels experienced on the range and within Fort Carson, the exact amount of increase is unknown. However, the increase in noise should primarily affect only the area that is already designated as Noise Zone III and, to a lesser extent, the current Noise Zone II. Figure 4.8-1 presents a detailed view of the current ICUZ zones in the vicinity of the range (U.S. Army 1986). SAC operations would affect only the southeastern portions of these zones in the immediate vicinity of the target area.

Currently, the Noise Zone III surrounding the range is well within the southern boundary of Fort Carson. This zone would probably not expand beyond the reservation boundaries as a result of the proposed action. Noise Zone II, which currently extends slightly beyond the southern boundary (see Figure 4.8-1), would expand further to the south as a result of the proposed SAC operations. However, no sensitive land uses have been identified in this area; consequently, the increase in noise at the range is not expected to result in significant impacts. The western portion of the noise zone illustrated in Figure 4.8-1, which overlaps the Beaver Creek and Pinon Valley Subdivision, would not be affected by the proposed action.

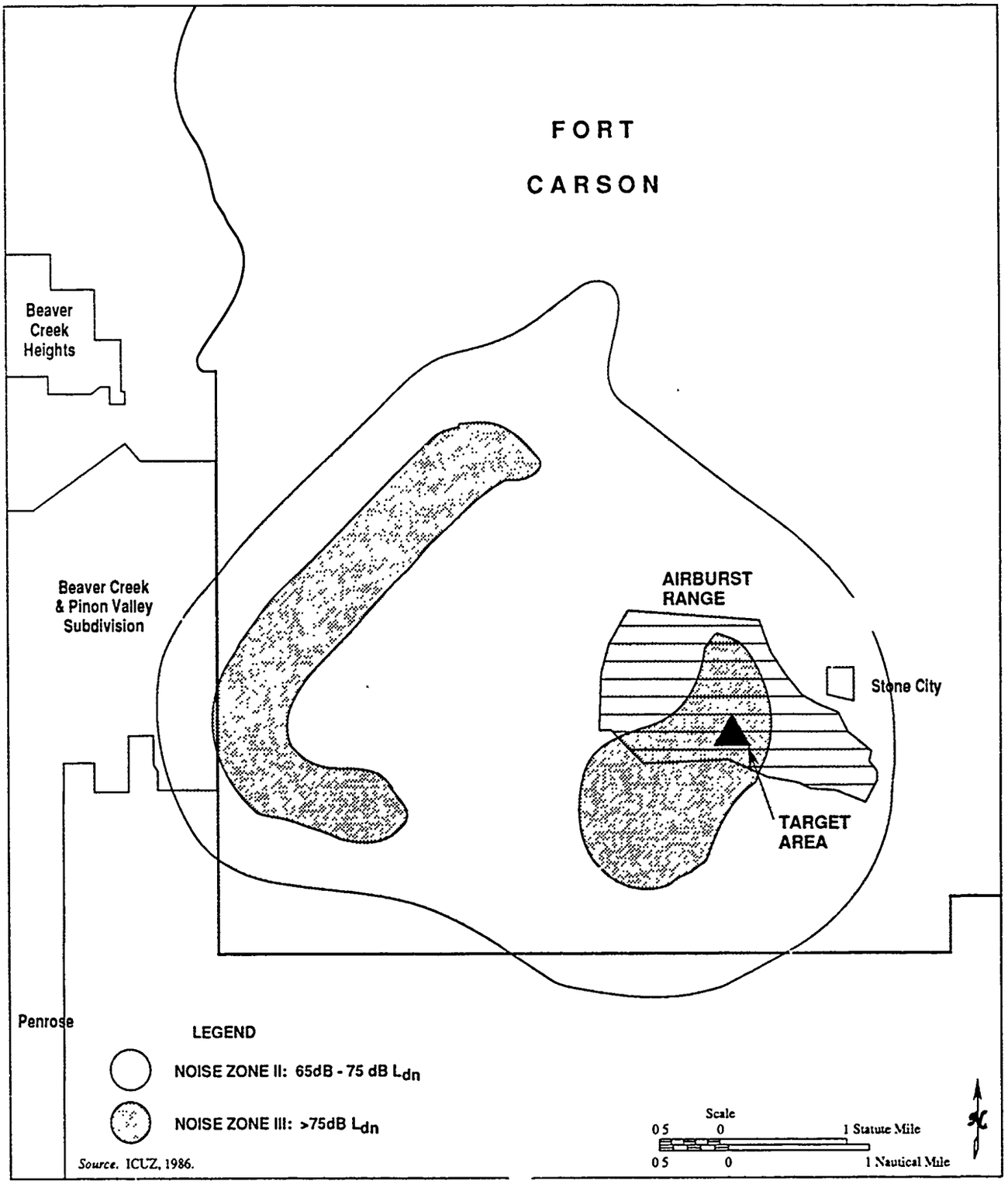


Figure 4.8-1

ICUZ NOISE ZONES IN THE VICINITY OF THE AIRBURST RANGE

4.8.2 IR-409

Calculated noise levels for IR-409, including both current operations and the proposed SAC operations, are provided in Table 4.8-1. Average daily noise levels (L_{dn}) would exceed a level of 65 dB over some portions of IR-409, most notably on the approach to the range after crossing Highway 50. This area would experience the highest L_{dn} value at 69 dB, decreasing to 65 dB at approximately 3,500 feet from the centerline. From Point A to Point H, the average noise levels would increase by at least 10 dB as a result of the proposed action. This increase is largely due to the minimal current use on certain portions of the route (from Point A to Point G). According to the International Standards Organization (ISO) Recommendation R-1996-1971, noise levels are significant if they exceed an L_{dn} of 65 dB or a single-event level of 88 dB at noise sensitive locations, or if the average sound level increases above existing background levels by 10 dB or more. The 10-dB increase criterion is applied whether or not the L_{dn} exceeds 65 dB. Based on these criteria, the noise generated by the proposed action along IR-409 and the proposed B-1B racetrack would represent a substantial increase above current noise levels. However, these increases should not result in significant impacts to particular resources in the area, since the potentially affected areas fall within the recommended land uses for the L_{dn}-based noise zones. The existence of sensitive receptors and the determination of noise-related impacts on natural and human resources is addressed in section 4.0 for each resource area.

4.9 SOCIOECONOMICS

4.9.1 Population

The size of the population beneath the IR-409 corridor and in the vicinity of the Airburst Range would not be affected as a result of the proposed action. SAC usage of the range would not involve any transfer or billeting of Air Force personnel, nor would there be any change in procurements or any new construction activity. No movements of population are expected to result from the proposed action.

4.9.2 Public Acceptance

The proposed action would substantially increase the amount of flight activity along IR-409 and at the Airburst Range. The noise and visual effects associated with these activities would add to the effects of existing flights and increase the level of public annoyance in some areas. As described in Section 4.8, the increase in noise above average baseline levels would be substantial in some areas, particularly along the portions of IR-409 where current flight activity is minimal (Point A to Point G), and along the proposed B-1B racetrack (which currently experiences no low-level flight activity). Such increases in average noise levels can be considered significant when sensitive receptors are present. However, as shown in Table 4.8-1, the increased noise levels are still compatible with residential land uses in most cases (i.e., 65 dB or less). The highest L_{dn} (daily) value (69 dB) would be experienced between Highway 50 and Point I on the final approach to the range. This maximum level would occur directly beneath the aircraft flightrack and would decrease to an L_{dn} of 65 dB at 3,500 feet away. The affected area is currently not inhabited except for a single ranch that has been sensitive to noise in the past. In response to these complaints, pilots are instructed to laterally avoid this receptor as much as possible. It is assumed that all aircraft would continue to avoid direct overflight of this sensitive receptor. The average noise level would thereby be reduced to acceptable levels. In addition, it is unlikely that the proposed activity would ever reach the worst-case level of operations that was assumed in the ROUTEMAP analysis.

The public acceptance of military flight training in an area may also be a function of the single-event noise levels experienced. Table 4.9-1 describes the maximum single-event noise environment that can be expected at each of the communities located near the IR-409 and racetrack centerlines. These noise levels are based on the distance between the community and the route centerline and the altitude of the SAC aircraft. These noise levels were modeled using the AAMRL's Omega 10r program, which serves as a subroutine of the ROUTEMAP program. In all cases, single-event noise intrusion experienced at

Table 4.8-1

SUMMARY OF RESULTS: ROUTEMAP NOISE ANALYSIS

Ground Location	---------- L_{dnmr} ---------- *Baseline (dB)*	*w/SAC (dB)*	---------- L_{dn} (DAILY) ---------- *Baseline (dB)*	*w/SAC (dB)*
Route IR-409				
Pt. A to Pt. B	28	47	28	48
Pt. B to Pt. G	55	69	51	65
Pt. G to Pt. H	55	68	56	67
Pt. H to Hwy. 50	55	64	56	63
Hwy. 50 to Pt. I	65	70	62	68
B-52 Racetrack				
Departure Leg: Pt. I to Pt. H	44	50	44	51
Approach Leg: Pt. H to Hwy. 50	51	54	52	56
Approach Leg: Hwy. 50 to Pt. I	58	61	58	62
B-1B Racetrack				
Departure Leg: Pt. I to D23	---	54	---	55
Return Leg: D23 to Pt. G	---	52	---	54
Approach Leg: Pt. H to Hwy. 50	---	66	---	65
Approach Leg: Hwy. 50 to Pt. I	---	72	---	69

Table 4.9-1

SINGLE-EVENT NOISE LEVELS FOR SELECTED COMMUNITIES ALONG IR-409 AND THE AIRBURST RANGE RACETRACK

Town	*Distance from Centerline*[1] *(miles)*	*SAC Flight Altitudes*[2] *(feet AGL)*	UNATTENUATED SINGLE EVENT NOISE LEVELS[3] *B-52*	*B-1B*
Lamar	1	6,300	<65	83
Wiley	2.5	6,300	<65	72
Kornman	3	6,300	<65	69
Pritchet	3	400	<65	70
Kim	10	400	<65	<65
Penrose	1	1,500	66	<65
Canon City	8.5	1,500	<65	<65
Florence	4.5	1,500	<65	<65
Pueblo West	8	1,000	<65	<65
Boone	3	4,500	<65	69

Notes:
1. Distances are from nearest aircraft flight track and are estimated.
2. Altitude (in feet above ground level) at which SAC aircraft would be flying when passing each town.
3. Estimated for each aircraft type by computer simulation with AAMRL's Omega10r program. Represents the noise level (in dB) resulting from a single aircraft overflight not accounting for possible attenuation effects.

Source: SAIC 1989.

these towns would be less than the 88 dB single-event criteria specified by the ISO (see section 4.8.2). Since SAC aircraft may leave the route centerline in an effort to distance themselves laterally from populated areas, the single-event levels actually experienced may be lower than those estimated.

Considering the very low population density in all of the affected areas, and the generally compatible average noise levels that would be generated, the proposed action is not expected to significantly affect public acceptance in the area. Some increase in noise complaints may occur in some areas, perhaps due to single-event noise intrusion or the increase in the frequency of flights. However, normal Air Force procedures aimed at avoiding identified sensitive receptors should be sufficient to mitigate any potential public acceptance problems that may arise.

4.9.3 Economic Setting

SAC use of IR-409 and the Airburst Range would have little to no impact on tourism or other local economic activities. Populated areas and sensitive receptors are routinely avoided by aircraft to the greatest extent possible. If individual farms or tourist attractions were to experience impacts from SAC flight activity, they could be similarly classified as sensitive areas and every effort would be made to avoid them.

4.10 AIRSPACE MANAGEMENT

Proposed SAC use of IR-409 would increase the number of military aircraft transiting the Pinon Canyon MOA airspace, but this is not expected to be a significant impact. The proposed action would also increase military operations within the Fremont and La Veta Low MOAs, but this would have a minor effect on the MOA airspace. Pilots are warned through notices to airmen (NOTAM) to avoid active MOAs, although they are allowed to transit an active MOA at any time. The majority of civil aircraft avoid active MOAs due to the high-speed military jet activity that commonly occurs within this airspace.

SAC aircraft would be required to remain clear of live fire areas associated with Army training activities within R-2601. SAC, ANG, and Fort Carson personnel would coordinate the proposed flying activity by B-52 and B-1B aircraft. This process would establish operational procedures that SAC aircrews, the Airburst range control officer, and Army units would adhere to while operating within R-2601. These procedures would enhance the operational effectiveness of the various training exercises, as well as address all safety-related issues. This level of coordination is not expected to result in significant impacts on the use of R-2601.

The proposed action would increase the number of annual sorties flown on IR-409 by a maximum of 2,080. This increase is not considered to be a significant impact to the operational capacity of the MTR.

SAC aircraft would operate at either 400 feet or 1,000 feet AGL along most portions of IR-409. These altitudes are well below the minimum altitudes of the majority of the federal airways in the vicinity of the route. Therefore, SAC operations on IR-409 would not significantly affect civil aircraft operating on nearby airways. Possible airway conflicts could arise at the route's origin, near federal airway V-263, where military aircraft enter IR-409 at 10,000 feet MSL. However, since all aircraft would be under the control of Pueblo Approach prior to entering the MTR, the potential for a traffic conflict would be small. All military aircraft operating within the Fremont MOA are required to maintain a minimum altitude of 1,500 feet AGL, which is at the base of the airspace assigned to federal airway V-244. B-52 use of the established racetrack through the Fremont MOA is not expected to conflict with civil aircraft operations on V-244.

The proposed action could have an impact on uncontrolled airspace users wherever an MTR transited this airspace and where civil aviation users were unaware of the MTR's scheduled activity.

Approximately nine public (non-ATC controlled) airports are located within 20 NM of the IR-409 corridor. General aviation aircraft could be expected to pass through the route corridor between these airports; however, increased SAC operations on IR-409 are not expected to curtail these civil aircraft flights or substantially increase safety hazards.

Issues that could affect the operation of the SAC B-1B aircraft on the Airburst Range include the continued growth of civil aviation operations in the area and the fact that, due to its high airspeed (550 KTAS) and large minimum turning radius (6 NM), the B-1B cannot operate entirely within the confines of the restricted airspace assigned to the range. Potential conflicts could occur between B-1B and civil aircraft when both types of users propose to operate in the same airspace.

Under the proposed action, B-1B aircraft would exit R-2601 to the east following munitions delivery on Airburst Range. Immediately following weapons release, B-1B aircraft would begin an approximate 3,000-foot ascent and would re-enter the ATC-controlled airspace east of Fort Carson at 10,000 feet MSL. Within ATC-controlled airspace, the B-1Bs would be under the guidance of either Colorado Springs Approach Control or Pueblo Approach Control. All B-1B aircraft would maintain a heading of approximately 100 degrees after exiting R-2601, passing approximately 9 NM to the north of Pueblo. The heading would be maintained until intercepting the 010-degree radial from the Pueblo Vortac station, at which point the B-1B aircraft would commence a turn to a new heading of approximately 200 degrees. This heading would be maintained until the 160-degree radial of the Pueblo Vortac station is intercepted, at which point the aircraft would begin a descent from 10,000 feet MSL to 1,000 feet AGL. This would allow the aircraft to reenter IR-409 at Point G to make subsequent passes over the Airburst Range.

Air carrier operations into and out of Denver and Colorado Springs could be affected by the proposed B-1B racetrack pattern. Coordination between SAC and the FAA at Denver Center, Pueblo Approach Control, and Colorado Springs Approach Control would be required to minimize air traffic conflicts between B-1B aircraft and commercial air carrier traffic east of R-2601.

4.11 AIR SAFETY

Any aircraft flight, whether civilian or military, involves the risk of an accident. However, the probability of a mishap, whether due to pilot error, aircraft malfunction, adverse weather conditions, or obstructions, is low. As noted in sections 3.10 and 3.11, the Air Force has extensive planning and flight procedures to avoid conflicts with other aircraft operations. Further, the potential for injury to civilians due to a mishap is extremely low considering the sparse population beneath IR-409 and near the Airburst Range. The risk of injury to Army personnel and recreational users from aerial bombing is a concern on Fort Carson. However, coordinated scheduling of training activities between Fort Carson and Airburst Range personnel should minimize potential safety hazards.

As shown in Table 4.11-1, three accidents involving B-52 aircraft have occurred in a total of 342,499 flying hours from 1986 to 1989. (There have also been three mishaps involving the B-1B, including a mishap o MTR, but information on total B-1B flying hours is not available.) In all three of the B-52 crash, the mishap occurred on a military runway and did not involve loss of civilian lives or civilian property damage. Using these data, the mishap rate for the B-52 is 0.88 per 100,000 flying hours. This rate is lower than mishap rates for 1980 through 1985 (1.01 mishaps per 100,000 flying hours).

Table 4.11-1

B-52 Mishaps

	FY 1986	*FY 1987*	*FY 1988*	*FY 1989*[1]
B-52 mishaps	0	0	2	1
Flying hours	101,133	104,703	97,267	39,396

Occurrences

2/11/88	Runway mishap; Castle AFB, California.
6/10/88	Runway mishap; Nellis AFB, Nevada.
12/6/88 (FY 89)	Runway mishap; K. I. Sawyer AFB, Michigan.

Note: 1. Fiscal year as of February 28, 1989.

Source: Personal communication, HQ SAC/JA 1989.

The Air Force is concerned about potential bird strikes and has required BASH team programs for all installations with a flying mission (personal communication, Capt. R. Defusco 1989). The BASH team's programs at the base level, the team itself, BAM graphs, and increased awareness among aircrews help reduce the risk of bird strikes. The bird strike potential is generally very low in the vicinity of Airburst Range and IR-409. The greatest bird strike hazard exists near the Arkansas River, particularly at the several reservoirs north of the river near La Junta, Colorado, which attract large numbers of waterfowl and raptors. This area is several miles from the route, range, and either racetrack; therefore, the proposed action is not expected to significantly increase the potential for bird strikes in the project area. Pilots are advised to practice the "see and avoid" method at all times and to be alert to the presence of thermals, which may attract soaring raptors.

While the proposed action would incrementally increase the potential for aircraft mishaps, ground hazards, and bird strikes in the vicinity of IR-409 and the Airburst Range, these increases are expected to be negligible and do not constitute a significant impact on air safety.

5.0 FINDINGS

This environmental assessment has evaluated the potential environmental impacts of low-level flights along IR-409 and low-level weapons training operations at the Airburst Range by SAC aircraft. Potential impacts of the proposed action were assessed in regard to the following environmental resources.

EARTH RESOURCES. The proposed action would have no significant impact on soils or topography in the vicinity of the Airburst Range or IR-409. Ordnance debris from the inert munitions dropped by SAC aircrews onto the range's impact area is not a source of soil contamination. The increased use of Airburst Range will contribute to local soil erosion and silt loading, but at an insignificant level. These impacts are and will continue to be mitigated by erosion control dams and other practices as part of the overall land management program for Fort Carson (140 TFW 1977).

WATER RESOURCES. Water availability in the study area would not be affected as a result of the proposed action. Potential for contamination of surface or groundwater caused by leaching of inert ordnance debris is negligible. The increased use of Airburst Range will minimally contribute to local soil erosion and silt loading. As described above, these impacts are and will continue to be mitigated by Fort Carson land management policies (140 TFW 1977). The proposed action would have no effect on water resources located under the routes.

AIR QUALITY. The proposed action would minimally increase air pollutants within the airspace used for the proposed action and would therefore minimally reduce visibility. The emissions would be intermittent at a point in space and would be dispersed over a large area. Since all ground-level pollutant levels fall below the NAAQS standards, the proposed action is not expected to have a significant impact on air quality.

BIOLOGICAL RESOURCES. Practice bombing and ordnance disposal activity on the range would be confined to the target area, which is already subject to repeated disturbances of this nature. Additional impacts on range vegetation and habitat would therefore be minimal. The projected increase in noise levels associated with increased flights may temporarily disturb birds and other wildlife, including threatened and endangered species, in the vicinity of the route and range. However, special operating procedures associated with the proposed action would be sufficient to avoid significant impacts on bighorn sheep, bald eagles, and other biological resources. The potential increase in bird strikes in the project area is likewise considered to be an insignificant impact.

LAND USE. The proposed action's primary impact on land use would be noise and safety concerns associated with low-flying jet aircraft. The increased use of the Airburst Range could increase the potential liability for personal injury to Army personnel or recreational users of Fort Carson. However, continued coordination of training schedules between the range and Fort Carson should mitigate these safety concerns to a large degree. The increase in sorties is not expected to cause conflicts with the current land use (military) of the installation. Developed areas adjacent to Fort Carson may experience increased noise levels as a result of the proposed action, but these levels would not exceed 65 L_{dn}, the limit for compatibility with residential land uses. Potential land use conflicts with aircraft overflights along IR-409 and in the vicinity of the range could be avoided by lateral or vertical separation.

VISUAL RESOURCES. Visual impacts associated with the proposed action would be low due to the sparse population and lack of sensitive land uses in the project area. While the local topography and vegetation do not provide screening from views of the aircraft, these views would be very brief and are not considered a significant impact on visual resources. Special operating procedures could be adopted if sensitive receptors are identified in the future.

CULTURAL RESOURCES. The proposed action is expected to have no impact on cultural resources. Although portions of a high sensitivity zone along Booth Gulch occur nearby, actual survey data of Airburst Range and adjacent areas indicate significant cultural resources do not occur in ares that would be affected. In addition, the proposed action will focus on increased use of existing target areas that can be assumed to be highly disturbed and lacking in intact prehistoric or historic remains.

NOISE. Average noise levels would increase substantially in certain areas as a result of the proposed action. However, L_{dn} and L_{dnmr} values would remain compatible with existing land uses in most areas. Noise impacts on natural and human resources would depend on the existence and sensitivity of particular receptors Potential impacts could be mitigated through normal Air Force procedures for avoiding noise-sensitive areas.

SOCIOECONOMICS. Population size and distribution near the range and under the route would not be affected by the proposed action. Public acceptance of SAC flights would vary depending upon the area affected and the sensitivity of the receptor. In general, people in the area are accustomed to low-level training activities and rarely file complaints. The affected areas are also very sparsely populated. Identification and avoidance of sensitive receptors, along with the special operating procedures listed in section 6.0, should minimize any potential decrease in public acceptance. The proposed action is expected to have no significant impacts on socioeconomics.

AIRSPACE MANAGEMENT. SAC use of IR-409, the Airburst Range, and all associated airspace would result in minimal impacts to airspace management. Potential conflicts or safety concerns between civil aircraft and SAC B-1Bs operating on the proposed racetrack pattern east of Fort Carson can be alleviated by thorough coordination between SAC, FAA, and Fort Carson personnel.

AIR SAFETY. The probability of an aircraft mishap is low, especially a mishap that would result in injury to civilians or private property. The bird strike potential for the Airburst Range and IR-409 is also low and is not expected to increase appreciably due to the proposed action.

6.0 SPECIAL OPERATING PROCEDURES

SAC aircraft would adhere to all established operations procedures and restrictions for IR-409 and the Airburst Range. In addition, the Air Force would follow the special operating procedures identified below in order to minimize any potential impacts of SAC use of IR-409 and the Airburst Range.

- Maintain lateral separation from any identified sensitive noise receptors, particularly the town of Penrose and the ranch located south of the Fort Carson boundary.

- Inform Denver Center ATC when flying outside the designated restricted area (R-2601). FAA regulations require that all aircraft contact the nearest ATC center upon exiting military airspace and entering civilian airspace.

- Follow the current authorized radio-monitoring procedures contained in the FLIP AP/1B while transiting the Pinon Canyon MOA. In addition, all SAC aircrews should be briefed as to the scheduled activity in the MOA.

- Avoid direct overflight of bighorn sheep reintroduction areas or raise the minimum altitude to 1,500 feet AGL above these areas.

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Appendix A

ROUTE SPECIFICATIONS FOR IR-409

Appendix A -- Route Specifications for IR-409

Altitude	*Data Point*	*Facility/ Radial/Distance*	*Latitude/ Longitude*
100 MSL or as assigned at A	A	LAA VORTAC	38°11.8'N 102°41.2'W
100 MSL or as assigned to B	B	LAA 157/13	37°59.0'N 102°38.0'W
Descend to SFC B 77 MSL to alternate entry track to C 100 MSL 296.7 en route	C	LAA 161/28	37°43.5'N 102°37.0'W
SFC B 77 MSL to	D	TBE 092/23	37°10.0'N 103°08.0'W
SFC B 70 MSL to	E	TBE 125/24	36°58.0'N 103°16.0'W
SFC B 80 MSL to	F	TBE 302/30	37°36.0'N 104°03.0'W
SFC B 80 MSL to	G	PUB 189/23	37°56.0'N 104°37.0'W
SFC B 80 MSL to	H	PUB 245/27	38°12.0'N 104°59.0'W
SFC B 85 MSL to (enter R-2601)	I	PUB 278/23	38°26.0'N 104°53.0'W

Route Width: 3 NM either side of centerline from A to C; 8 NM either side of centerline from C to E; 7 NM south and 15 NM north of centerline from E to F (avoid Big Canyon Tryon Airport by 3 NM radius); 7 NM either side of centerline from F to G; 3 NM either side of centerline from G to H; 5.5 NM left and 3.5 NM right of centerline from H to I.

Total Distance: 220.3 NM

Hours of Operation: 0800 to 1600 local, Tuesday through Saturday; other times by NOTAM.

Operator/Scheduler: 140 TFW/DOT Buckley ANG Base, Aurora, CO 80011; AUTOVON 877-9478

Special Operating Procedures:

1. Participating aircraft separation: Route is designated for MARSA operations established by coordinated scheduling. Intraflight maneuvers to obtain element/aircraft separation will be contained within route airspace unless maneuvering clearance is received from ATC prior to route entry. Non-140 TFW flights/aircraft entering this route with less than 10 minutes separation will establish contact with preceding elements/aircraft and will call "in the blind" when passing each point on the route.

2. Monitor 296.7 en route. Monitor 255.4 from E to F for possible U.S. Army hel traffic in the Pinon Canyon MOA (Tobe VORTAC 13-29 L. 1E) up to 500 feet AGL.

3. Normal operating speed shall be the TAS filed in the flight plan. Deviations of 10 knots or greater shall be amended with ATC at route entry.

4. This route crosses IR-110 between C and G; IR-107 at E; IR-415 and VR-412 at G. Deconfliction scheduling applies. "See and be seen" is the method of MARSA.

5. Deconfliction with IR-107 and IR-110 is accomplished through 27 TFW, Cannon AFB, NM, AUTOVON 681-2276/2253.

6. Segments D through F are designated as a maneuvering area. Flights/aircraft may delay 0 + 15 between D and F.

7. All aircraft flying IR-409 will contact Pueblo Approach prior to point F for IFF code assignment on 290.5. Approval to fly IR-409 does not constitute clearance to enter R-2601. Aircraft not entering R-2601 must exit at G. Aircraft entering R-2601 can expect frequency change prior to H. Aircraft may be required to hold at H for range entry.

8. Aircraft providing close air support or making multi-attack patterns shall file the total delay time at exit I. Example: . . . IR-409 PUB 278/023/00 + 15 PUB 278/023 PUB . . .

9. Aircraft exiting at G will contact Pueblo Approach Control on 290.5. Climb to 10,000 MSL or as assigned by ATC and proceed to H until clearance is received.

10. Maintain 1,000-foot AGL minimum from G to H. After H, maintain 1,000-foot minimum until crossing Highway 50, then maintain 300-foot AGL minimum until on range.

11. Alternate entries: C, F, G, and H.

12. Alternate exit: G.

FSSs within 100-NM Radius: AMA, DEN, EGE, GCK, LVS, TAD, TCC.

Appendix B

DETAILED VIEW OF IR-409 ROUTE AND CORRIDOR

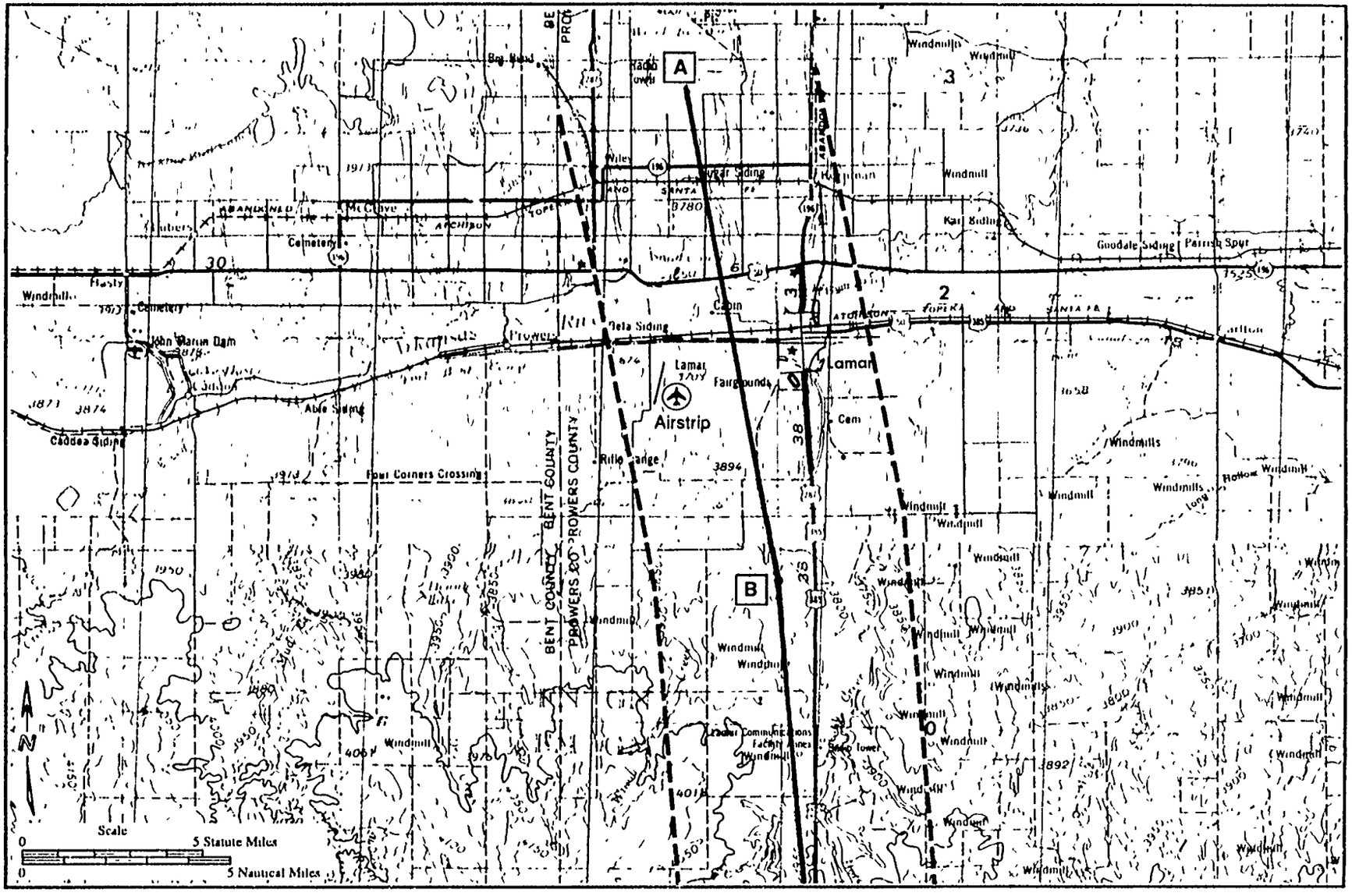

Figure B-1

DETAILED VIEW OF IR-409 ROUTE AND CORRIDOR
(Page 1 of 11)

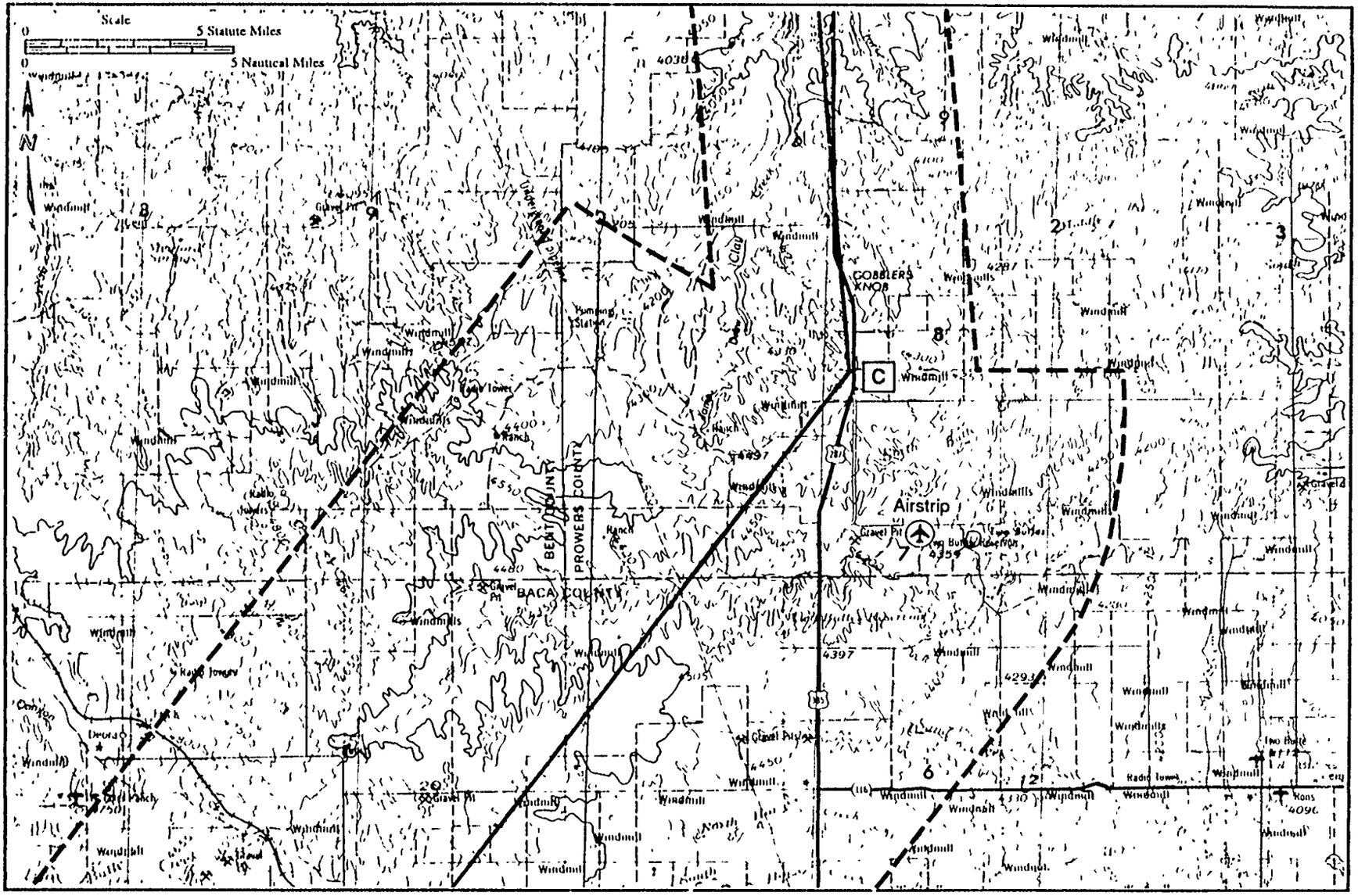

Figure B-1

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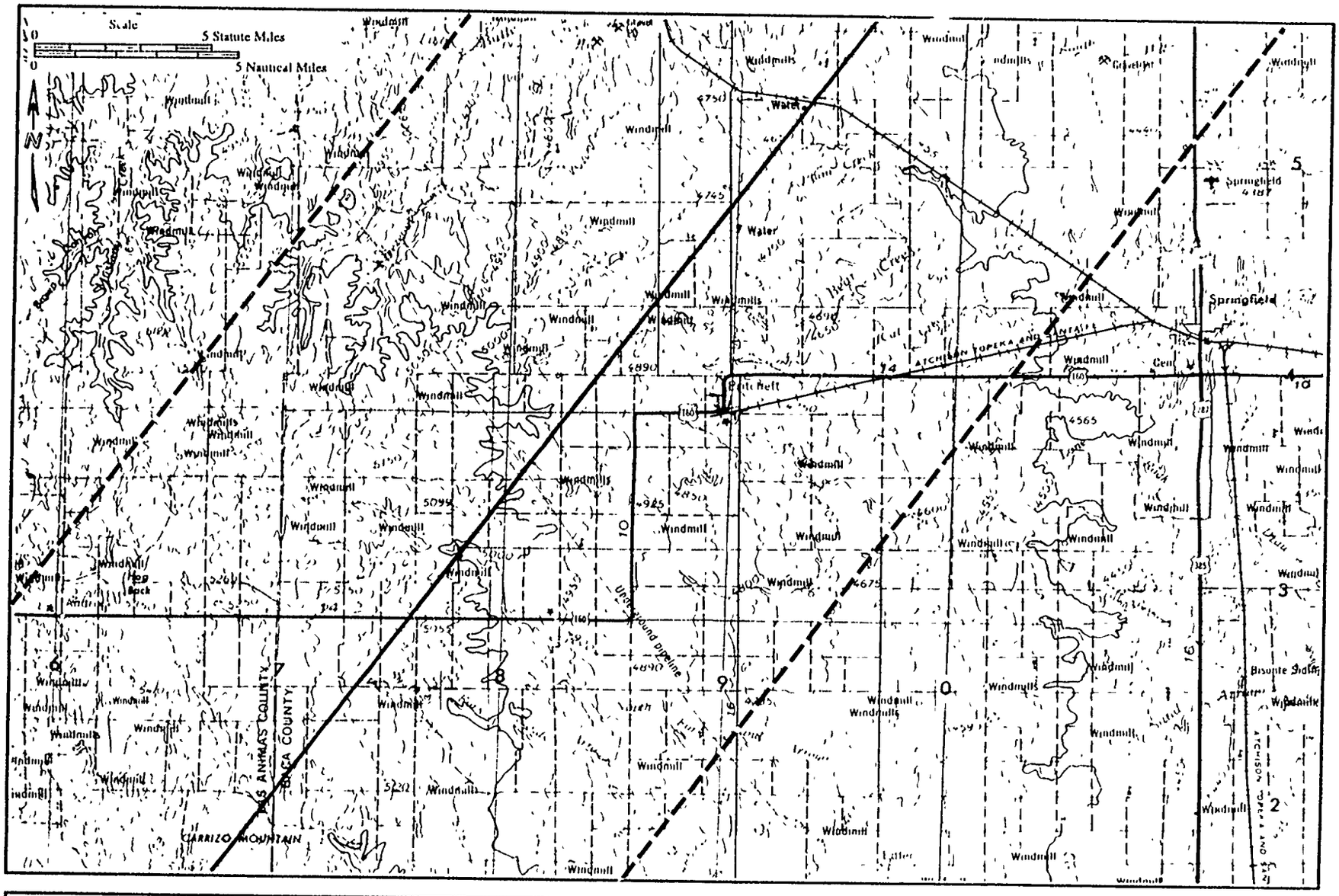

Figure B-1

DETAILED VIEW OF IR-409 ROUTE AND CORRIDOR

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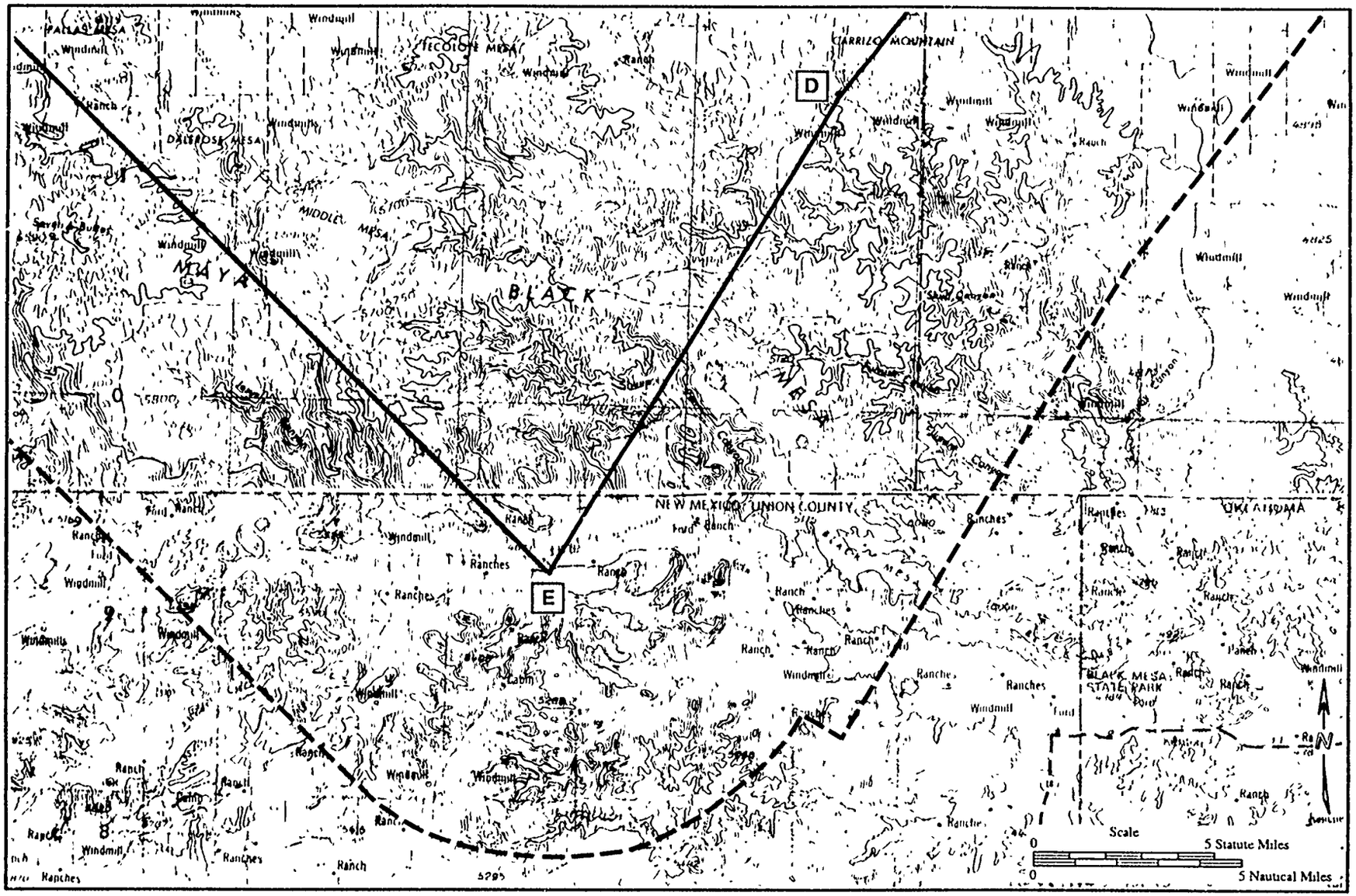

Figure B-1

DETAILED VIEW OF IR-409 ROUTE AND CORRIDOR

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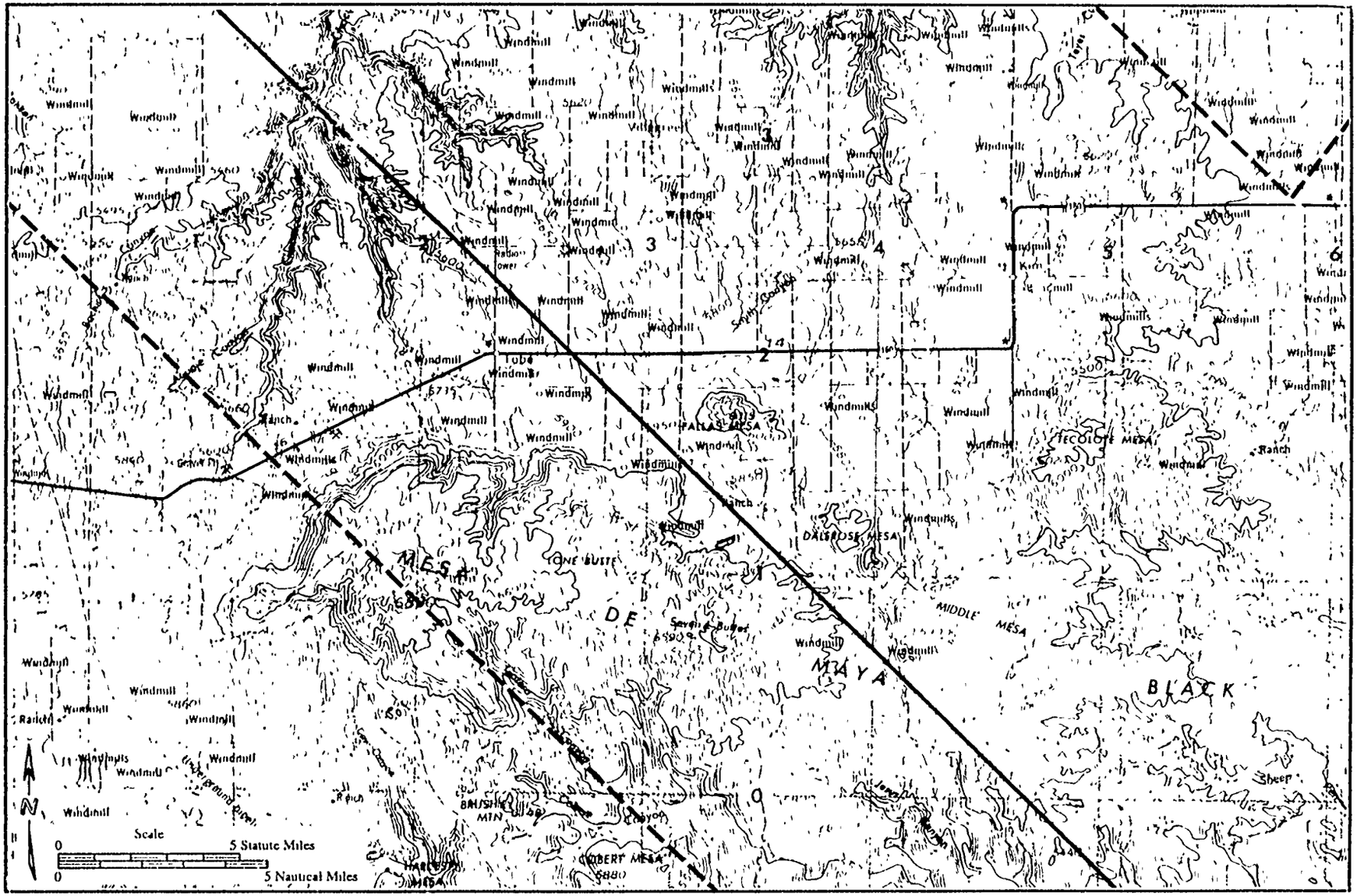

Figure B-1

DETAILED VIEW OF IR-409 ROUTE AND CORRIDOR

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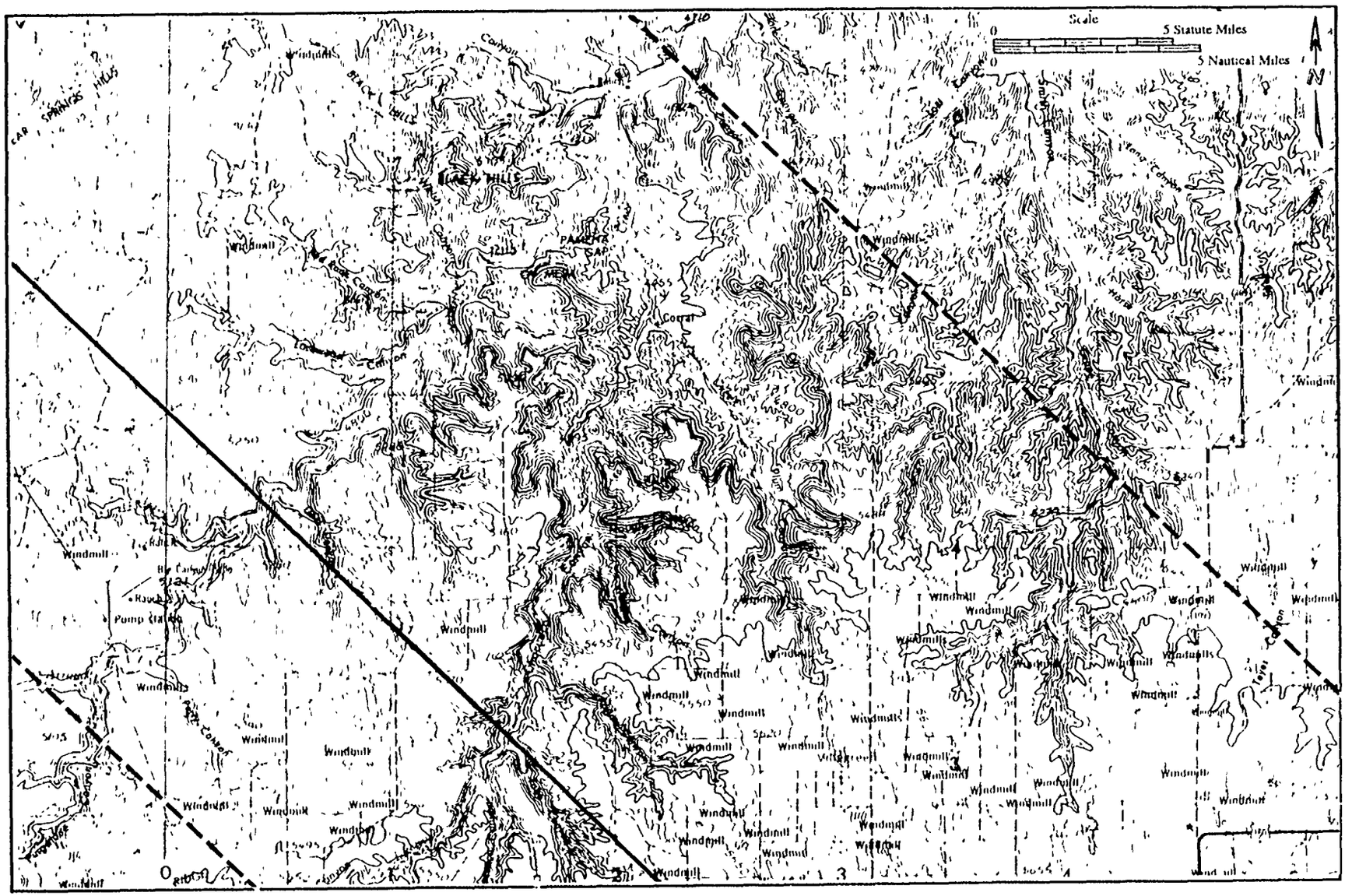

Figure B-1

DETAILED VIEW OF IR-409 ROUTE AND CORRIDOR

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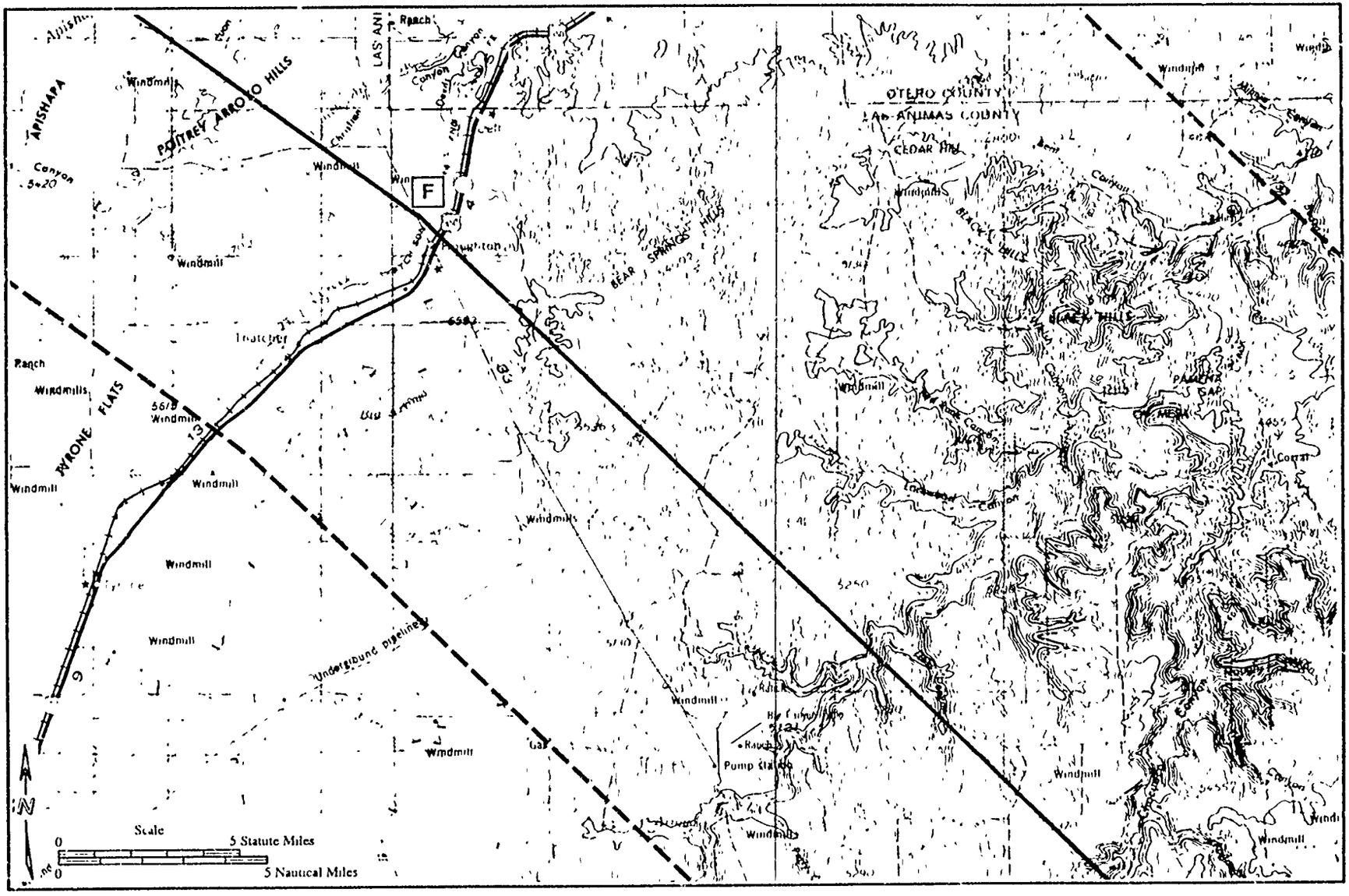

Figure B-1

DETAILED VIEW OF IR-409 ROUTE AND CORRIDOR
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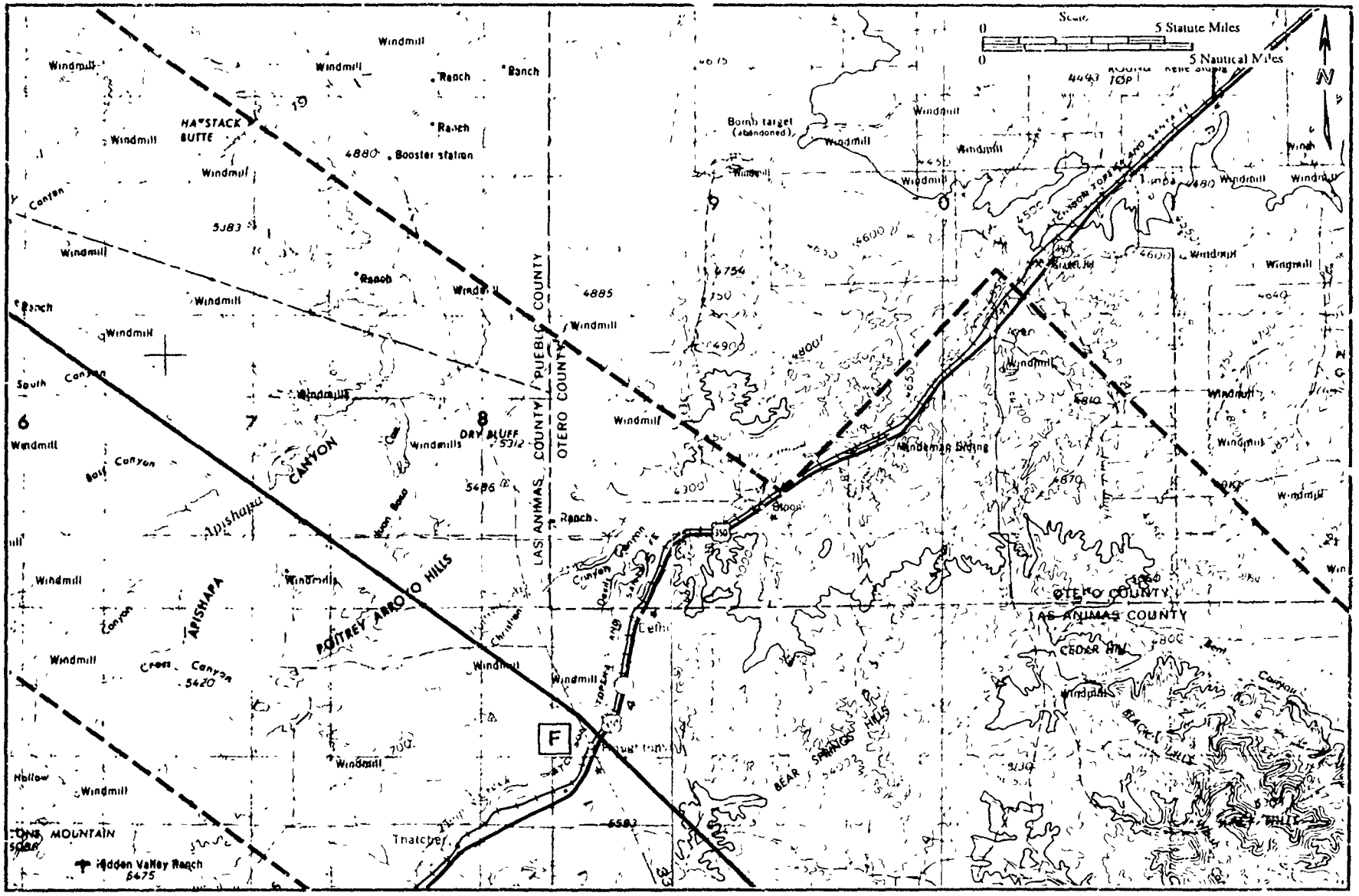

Figure B-1

DETAILED VIEW OF IR-409 ROUTE AND CORRIDOR

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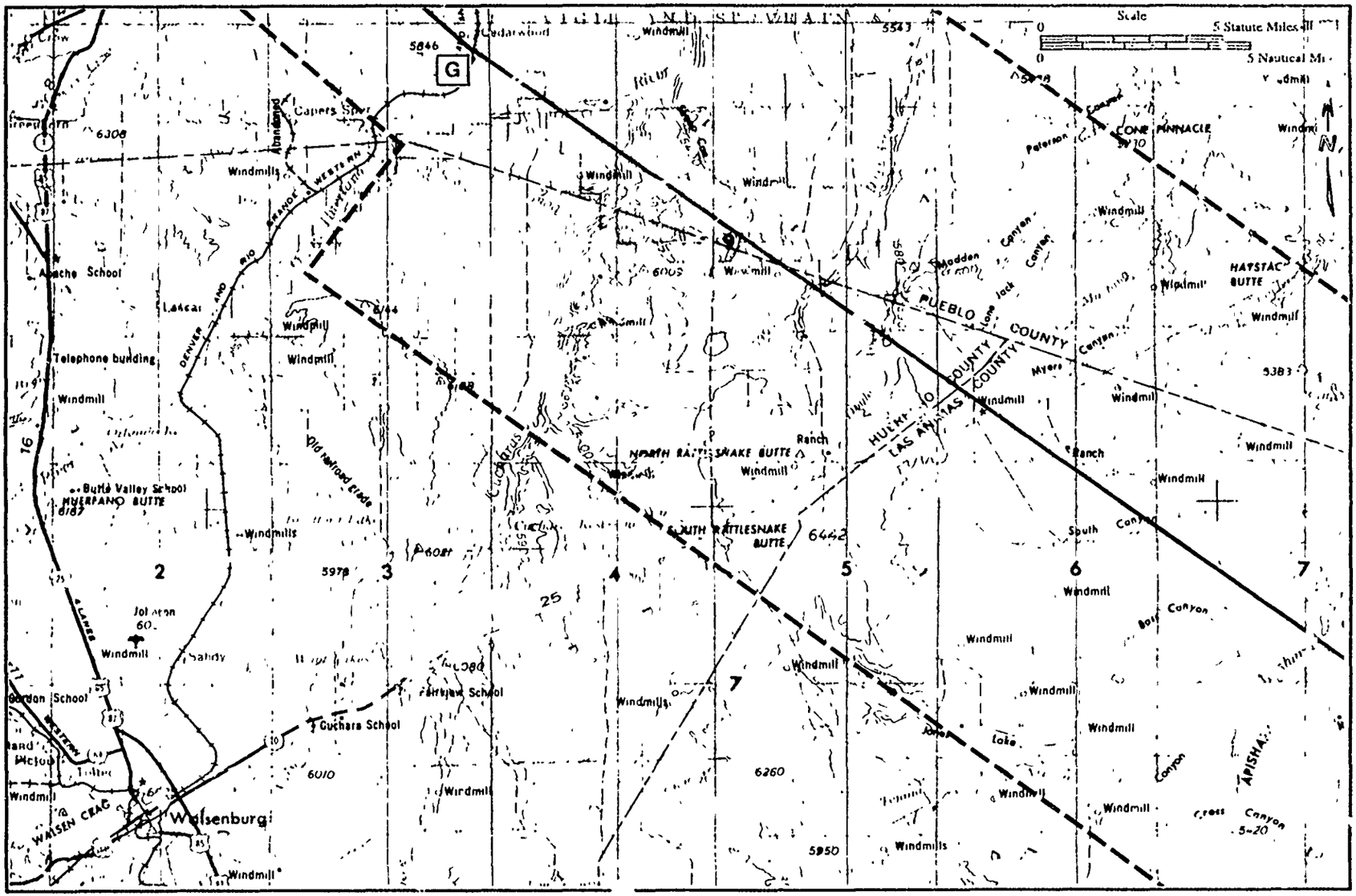

Figure B-1

DETAILED VIEV' OF IR-409 ROUTE AND CORRIDOR

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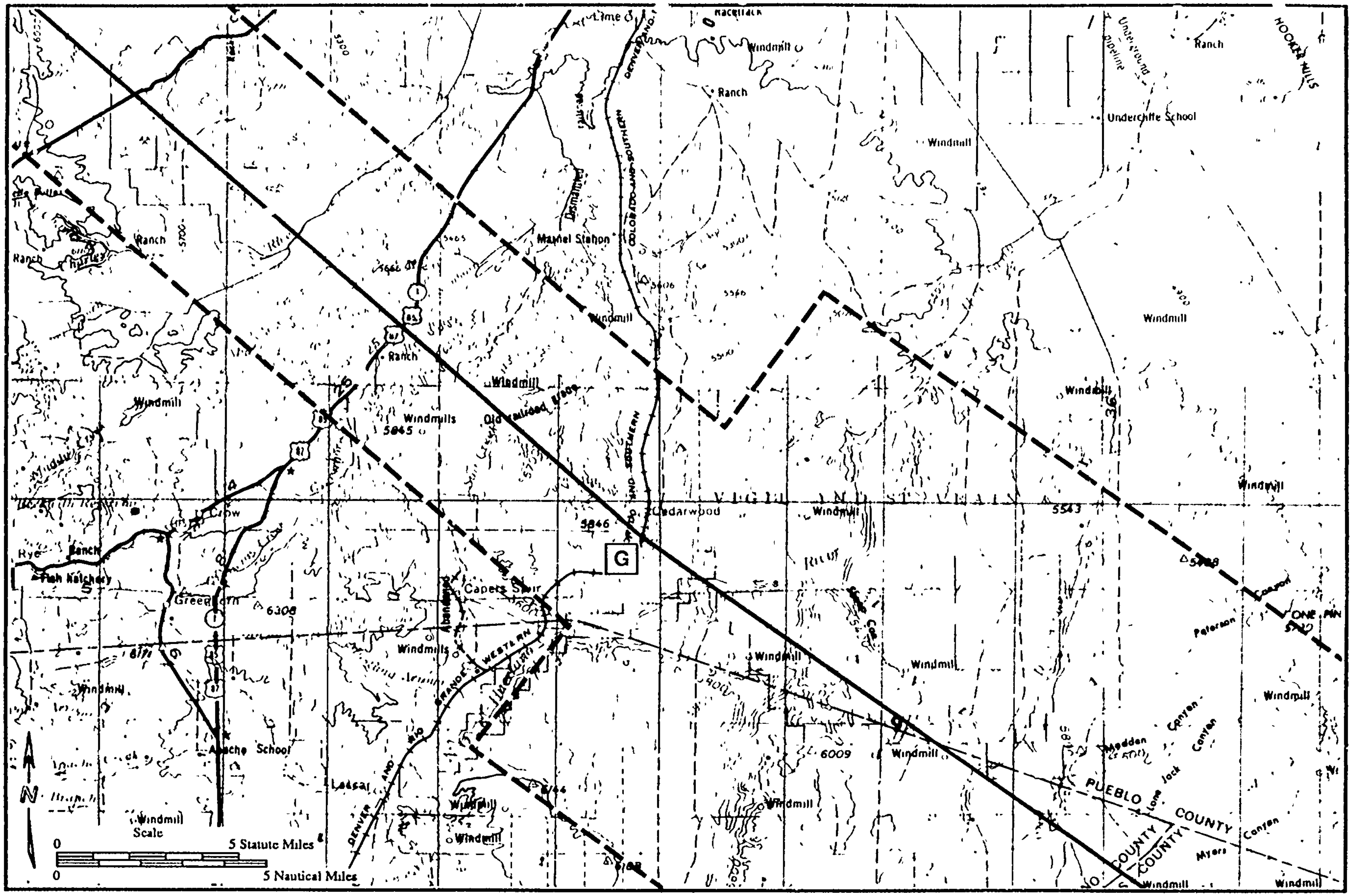


Figure B-1

DETAILED VIEW OF IR-409 ROUTE AND CORRIDOR
(Page 10 of 11)

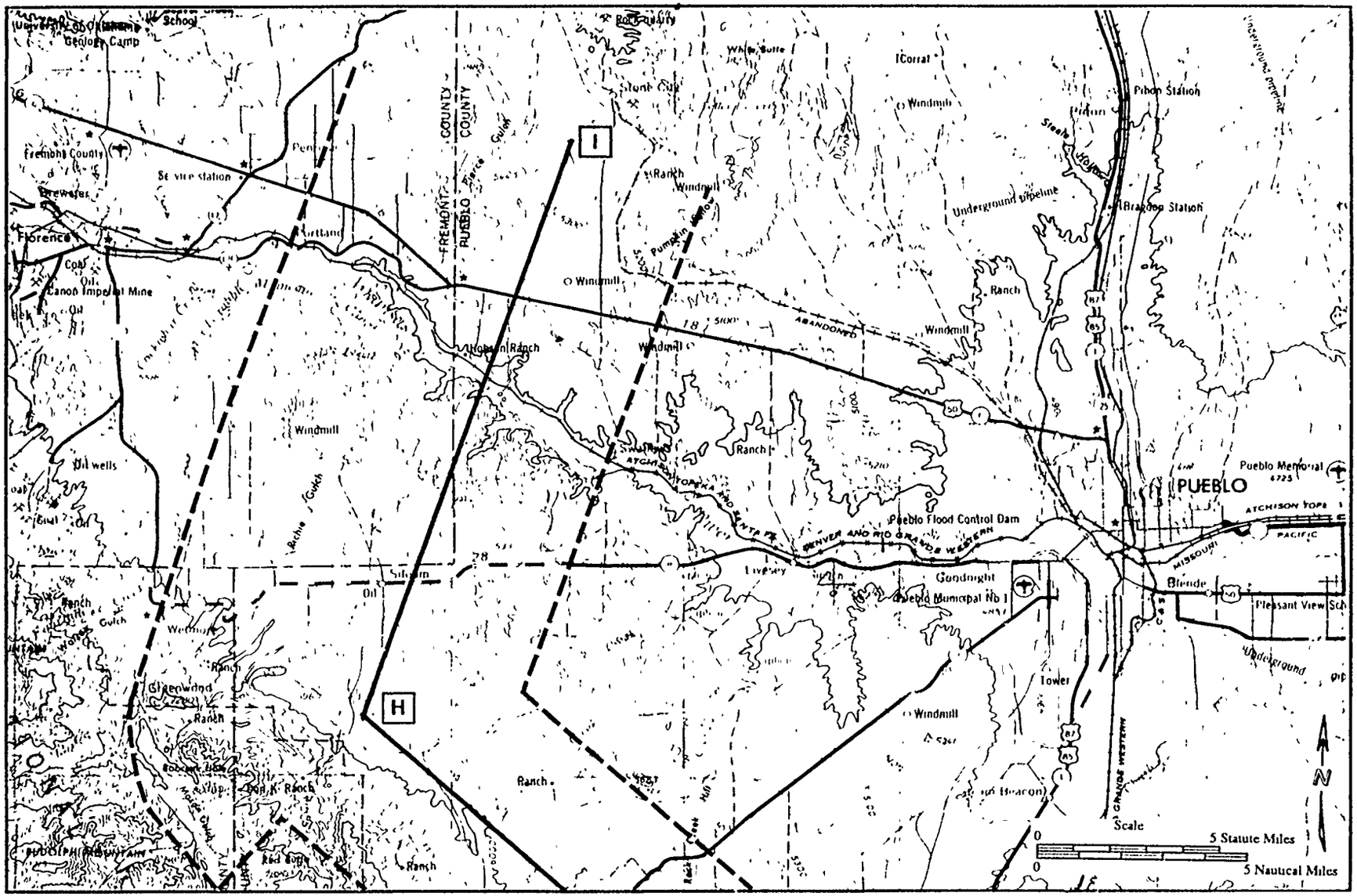


Figure B-1

DETAILED VIEW OF IR-409 ROUTE AND CORRIDOR

(Page 11 of 11)

Appendix C

AIRCRAFT DESCRIPTIONS

Fact Sheet

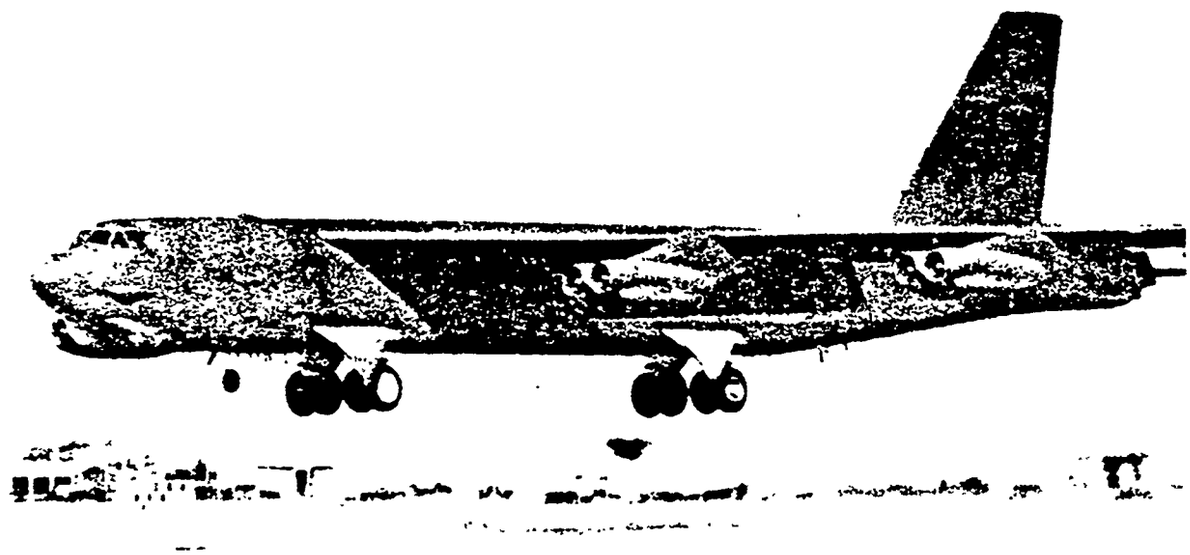
United States Air Force

HEADQUARTERS STRATEGIC AIR COMMAND, OFFUTT AFB, NE 68113

OFFICE OF PUBLIC AFFAIRS, TEL. (402) 294-2067

88-14

(Supersedes Fact Sheet 86-14)



B-52G

B-52 STRATOFORTRESS

The heavyweight among Strategic Air Command's bomber force is the Boeing B-52 Stratofortress. This aircraft is capable of high subsonic speeds and can fly at altitudes up to 50,000 feet.

The B-52 prototype first flew in April 1952, and SAC received its first B-52 in June 1955. The last B-52 -- the eighth version of the aircraft, an H model -- came off the production line in October 1962. SAC currently has the B-52G and B-52H models in its inventory of approximately 250 aircraft. These models, among America's first missile carrying bombers, can carry up to 20 missiles. While eight short range attack missiles can be carried in the internal weapons bay, 12 air-launched cruise missiles can be carried under the wings.

Designed as a nuclear bomber, the B-52 also carries conventional bombs. This flexibility to perform a dual role was dramatically highlighted by conventional operations in Southeast Asia. There, the B-52s provided direct air support, interdiction, and strategic bombing missions. In addition, they proved the effectiveness of the Stratofortress to successfuly penetrate heavy enemy defenses.

In support of the U.S. Navy's sea control operations, B-52s perform maritime missions. Some aircrews are trained to interdict enemy sea power, protect shipping, and conduct aerial minelaying operations. The B-52's capabilities also include sea surveillance and surface ship air interdiction. Air interdiction is performed by Harpoon-modified B-52s stationed at Loring AFB, Maine, and Andersen AFB, Guam.

Each of the eight jet engines on the B-52G develops up to 13,750 pounds of thrust or a total of approximately 104,000 pounds of power. The turbofan engines of the B-52H produce some 17,000 pounds of thrust per engine, significantly increasing this model's performance.

The B-52G has an unrefueled range of more than 7,500 miles, while the H model, with more fuel efficient engines, has an unrefueled range of more than 8,800 miles. Aerial refueling gives both models a range limited only by the endurance of their crews.

Although the B-52G and H models look almost the same as earlier models on the outside, they are quite different. The primary external differences are a shortened tail and the movement of the gunner's station from the tail to the forward section of the aircraft. These guns are aimed through tail-mounted radar systems. The G and H models have a bubbled nose area following installation of a low-level viewing system. They also have a new offensive avionics system replacing older bombing and navigation equipment.

Crew positions in both models are aircraft commander, pilot, radar navigator, navigator, electronic warfare officer and aerial gunner.

SPECIFICATIONS

	B-52G	B-52H
Max. takeoff weight	488,000 lbs	488,000 lbs
Speed (maximum)	650 mph	650 mph
Engines	8 J57-P-43W turbojets	8 TF33-P3/P-103 turbofans
Thrust per engine	up to 13,750 lbs (wet)	up to 17,000 lbs
Unrefueled range	7,500 miles	8,800 miles
Ceiling	50,000 ft	50,000 ft.
Armament	4 50-cal machine guns	20-mm Gatling type cannon
Weapons load	more than 20,000 lbs	more than 20,000 lbs.
Weapons load (conventional)	more than 38,000 lbs	
Crew	six	six
Unit flyaway cost	$49.2 million	$54.1 million
Dimensions:		
Span	185 ft	185 ft.
Sweepback	36 degrees	36 degrees
Length	160 ft	159 ft.
Height	40 ft	40 ft.

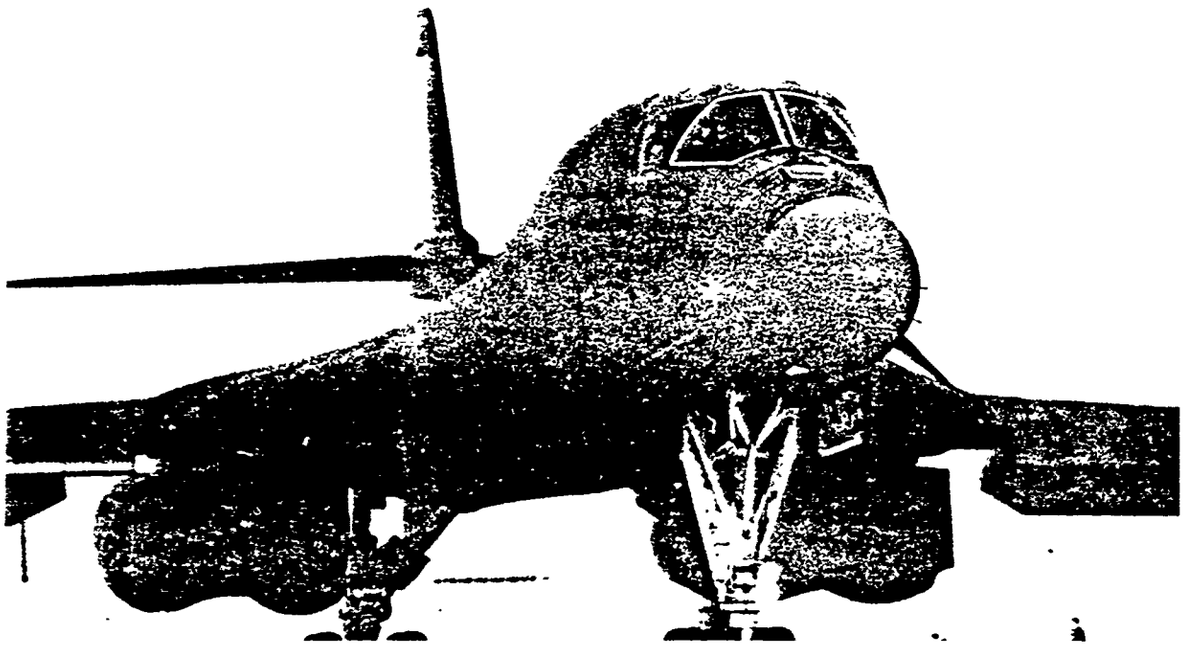
Fact Sheet

United States Air Force

HEADQUARTERS STRATEGIC AIR COMMAND, OFFICE OF PUBLIC AFFAIRS,
OFFUTT AFB, NE 68113 TEL. (402) 294-2067

88-41

(Supersedes Fact Sheet 84-41)



B-1B

The B-1B is Strategic Air Command's most modern strategic bomber. Advanced avionics equipment, the ability to carry a heavy weapons payload, and a reduced radar cross-section provide improved capability to penetrate enemy defenses.

Studies for an advanced bomber to replace the B-52 were initiated in 1965. The characteristics needed for this bomber were established following detailed studies of strategic concepts and numerous designs. In a 5-point strategic modernization program announced on Oct. 2, 1981, President Reagan stated that 100 B-1B aircraft would be built and deployed. The B-1B is a derivative aircraft which evolved from the B-1A in response to current and future strategic needs. Two of the four original B-1A aircraft were used for the B-1B developmental flight test program at Edwards AFB, Calif. The first production B-1Bs were delivered to Dyess AFB, Texas, in 1985, and the last arrived at McConnell AFB, Kan., in April 1988. Dyess became the home of the first fully operational wing of B-1Bs in 1986.

Today, the United States' strategic deterrence depends heavily on the Strategic Air Command bomber force. This manned bomber force can respond to changing combat situations and provide several options to the National Command Authorities. The Air Force considers the B-1B one of the most needed steps in strategic modernization.

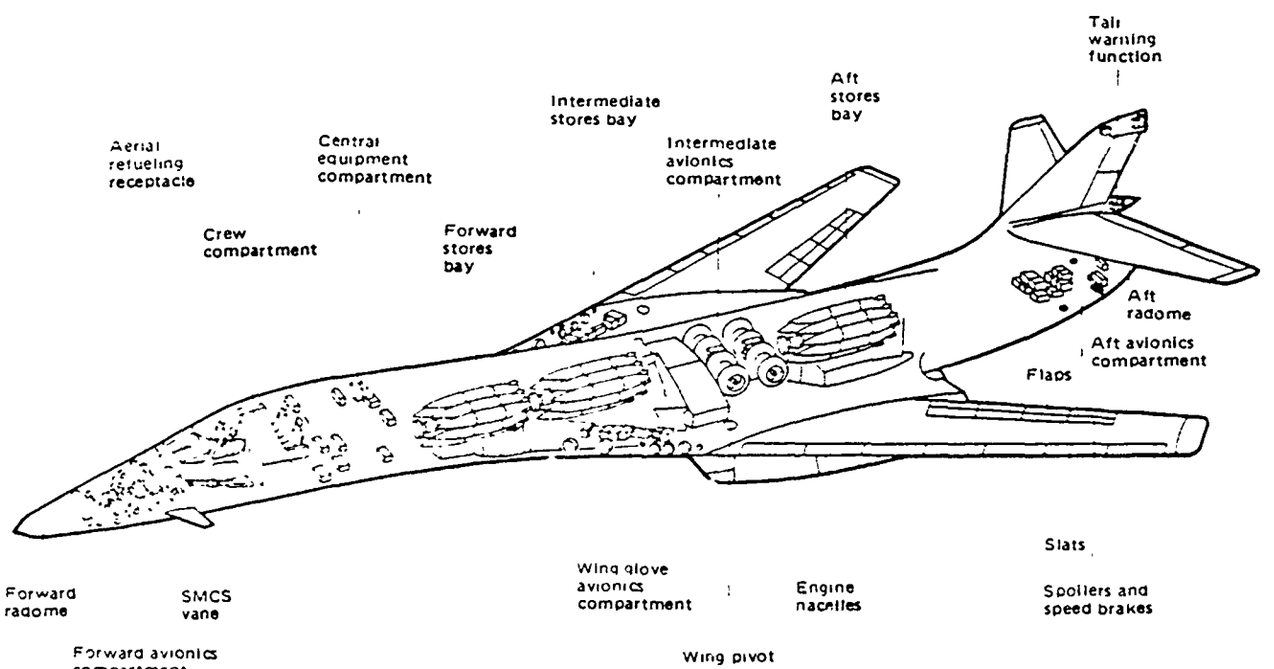
The B-1B takes advantage of the many advances made in airframe, engine, and avionics technology. It adds unique capabilities to U.S. deterrence by enhancing the mixed force concept of manned bombers and land-launched and sea-launched missiles.

The new variable-wing-geometry bomber can fly at low supersonic speeds at high altitude and high subsonic speeds at low level. On July 4, 1987, a B-1B set a series of international speed and distance with payload records including 670 mph over a 2,000 kilometer closed course carrying a 66,000 lb. payload. The bomber's wings extend forward to 15 degrees for takeoff and low-speed flight and sweep back to 67.5 degrees for flights at high speeds.

Smaller than the B-52, the B-1B is capable of intercontinental missions without aerial refueling. However, it is air refueling compatible with existing KC-135 and KC-10 tankers. Its quick takeoff capability and improved hardness to nuclear weapons effects improve the bomber force's ability to survive a missile attack. The B-1B, with its improved penetration aids and low radar cross-section, is more difficult for enemy defenses to detect.

The B-1B can carry a wide variety of current Air Force inventory weapons and advanced weapons which are being studied or developed. Weapons include gravity bombs, short range attack missiles (SRAM) and air-launched cruise missiles (ALCM).

Four wings are equipped with the B-1B: the 96 BMW, Dyess AFB, Texas; the 28 BMW, Ellsworth AFB, S.D., the 319 BMW, Grand Forks AFB, N.D., and the 384th BMW, McConnell AFB, Kan.

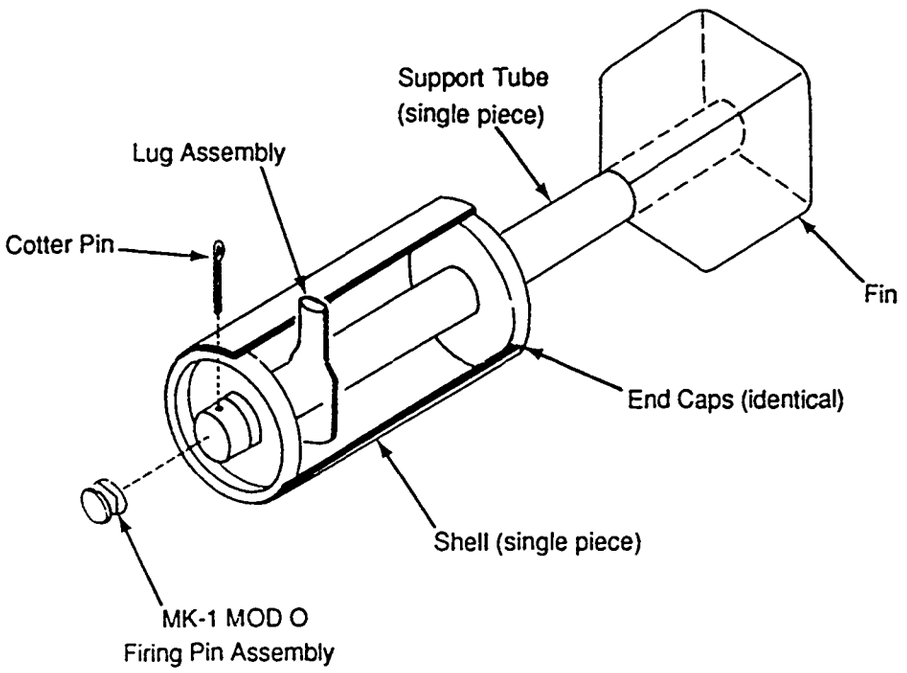


SPECIFICATIONS

Prime Contractor	Rockwell International
Engines	4 F101-GE-102 turbofans
Engine Manufacturer	General Electric
Thrust	30,000 lb class
Maximum Speed	Low supersonic (high subsonic for low altitude penetration)
Range	Intercontinental unrefueled
Maximum payload	125,000 lbs
Maximum operating weight	477,000 lbs
Crew	4 (aircraft commander, pilot, offensive systems officer, defensive systems officer)
Dimensions	Length - 146 ft; Height - 34 ft; Span (unswept) - 137 ft; Span (swept) - 78 ft.

Appendix D

PRACTICE MUNITIONS

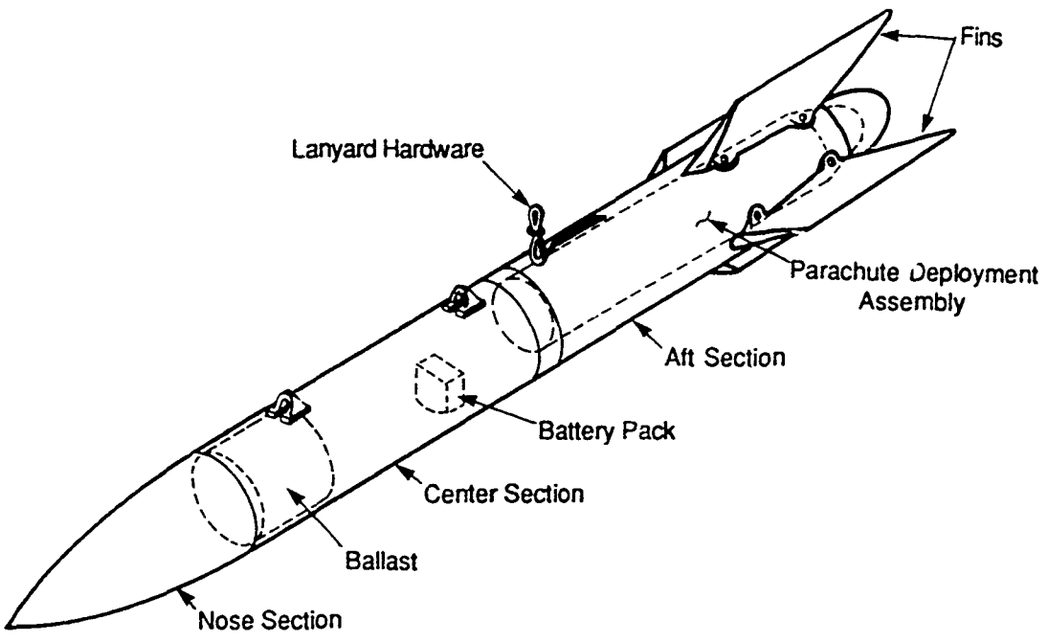


Characteristics:

Weight	10 lbs.
Length	19 in.
Diameter	4 in.

Figure D-1

BDU-48/B PRACTICE BOMB

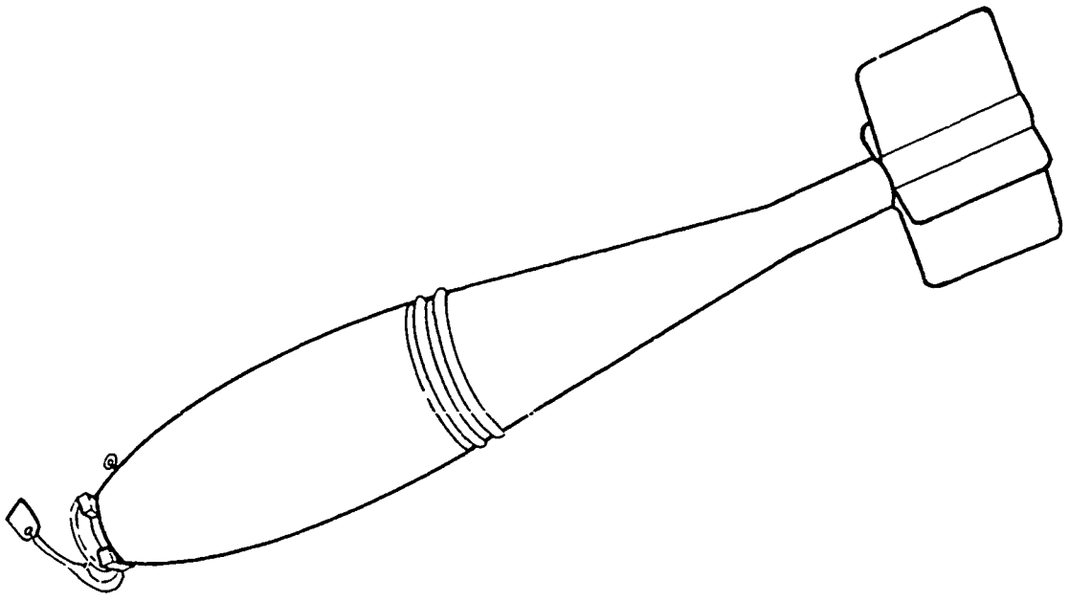


Characteristics:

Weight	715 ± 15 lbs.
Length	141.6 in.
Diameter	13.3 in.

Figure D-2

BDU-38/B PRACTICE BOMB



Characteristics:

Weight	25 lbs.
Length	22.5 in.
Diameter	4 in.

Figure D-3

BDU-33 PRACTICE BOMB

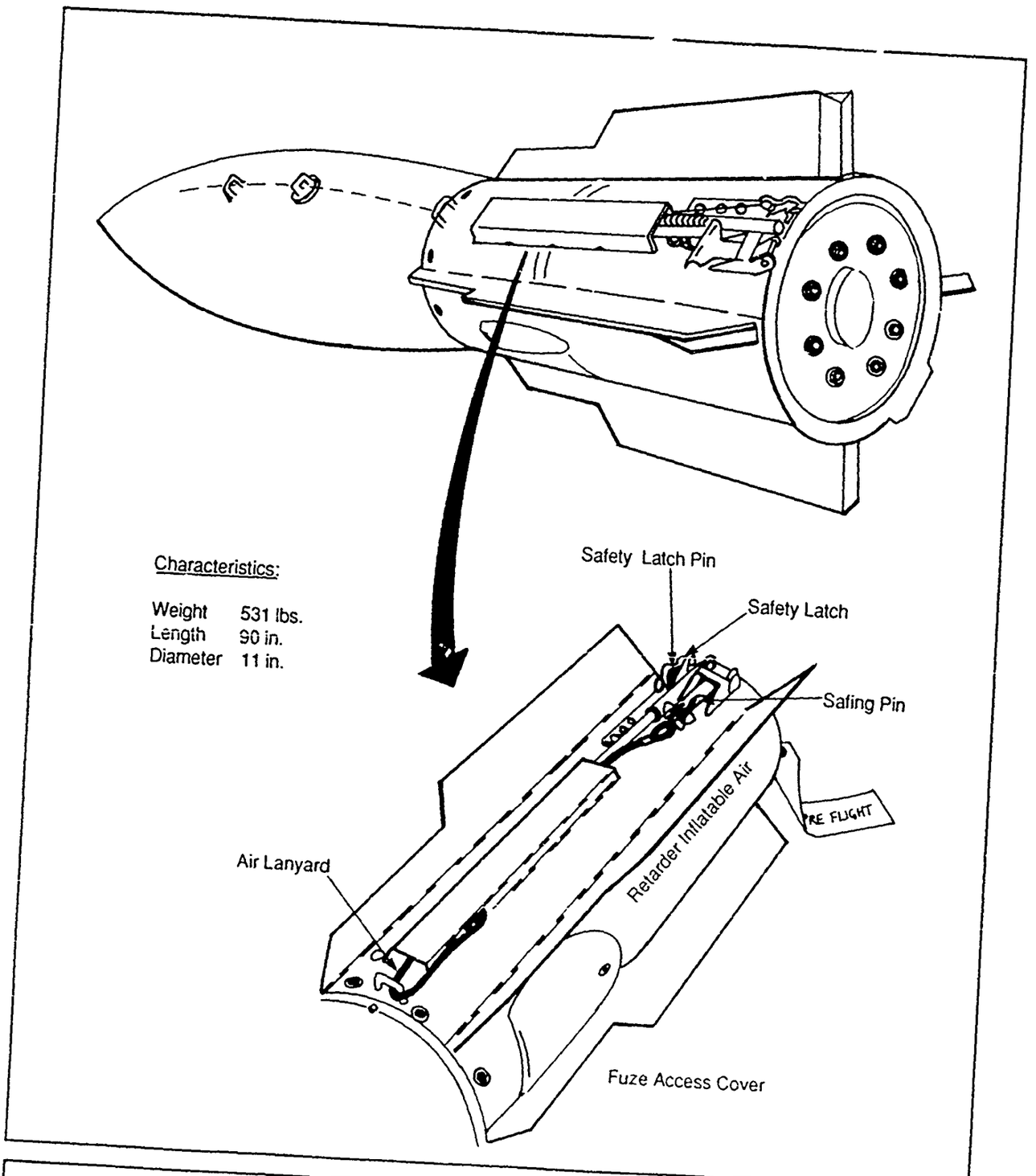


Figure D-4

BDU-50 PRACTICE BOMB

Appendix E

B-52/BDU-48 DROP ACTIVITIES

Appendix E -- B-52/BDU-48 Drop Activities

BDU-48 TRAINING DEVICE

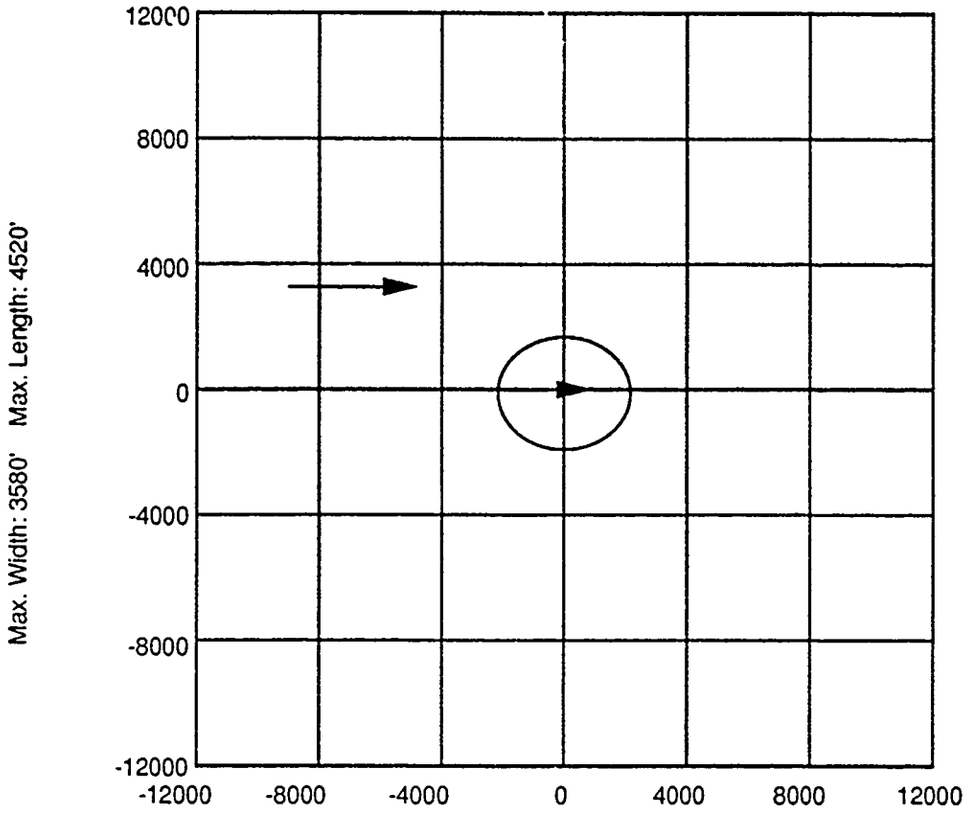
One of the training device that would be used for SAC range operations is the BDU-48. The BDU-48 is cylindrical with square fins on the tail section (see Appendix D). It weighs 10 pounds, is 19 inches in length, and 4 inches in diameter. The BDU-48 is inert, nonexplosive, and would be painted fluorescent orange to enable easy identification. When released from a B-52 at 500 feet AGL and 360 KIAS, the BDU-48 travels a distance of approximately 2,252 feet and impacts the ground at an angle of 27 degrees, nose down, and would penetrate sandy loam soil approximately 6 inches, and in no case greater than 1.2 feet. In the event of hard surface strike, maximum or worst-case ricochet is no greater than 580 feet along the axis of the strike. (Source: University of Oklahoma at Air Force Weapons Laboratory, Eglin AFB, Florida.)

BDU-48

The footprint is defined as an area where 99.9 percent of the BDU-48s are predicted to fall based on past range analysis. The present footprint developed by Headquarters SAC/NR (Science and Research) for the BDU-48 is an ellipse 4,520 feet long and 3,580 feet wide (see Figure E-1) and was developed from results of past range activity. Approval for the use of this footprint has been granted.

HUNG BDU-48 PROCEDURES

Should an aircraft experience a hung BDU-48, the aircraft would fly the established radar traffic pattern and land immediately. A review of the land area under the radar traffic pattern indicates the flight path avoids populated areas to the maximum extent possible, and is the best location for a hung BDU-48 pattern. According to HQ SAC/LGWC, a malfunctioning ejector rack or slow-burn ejector cartridge would be the cause of a hung BDU-48. However, this would be a rare occurrence. The ejector rack is designed so that the partial opening of an ejector rack is highly unlikely. Although the possibility exists for malfunctioning ejector cartridges, a low-burning cartridge cannot generate sufficient power to unlatch the rack hooks and cause a hung BDU-48. To date, B-52 aircraft have not experienced any inadvertent releases with a hung BDU-48.



FOOTPRINT NUMBER		
Aircraft Type:		B-52
Weapon Type:		BDU-48
Range Type:		Controlled
Target Type:		Soft
Dive Angle:		Level
Altitude Ingress	(Ft. AGL)	300 - 500
Altitude Release	(Ft. AGL)	300 - 500
Speed Ingress	(KIAS)	350 - 390
Speed Release	(KIAS)	350 - 390

FOOTPRINT PARAMETERS
Long (Down Range)
Short (Back Range)
Cross Range
Max Cross Range

Containment Level
99.99%

Confidence Level
95.0%

Low Threat Tactics
Full-up OAS Operation
Visual Target Identification

Figure E-1

PLOT OF BDU-48 SAFETY TRACE FOOTPRINT
B-52 300-500 FOOT, 350-390 KIAS

Appendix F

IMPACTS OF AIRCRAFT NOISE ON HUMANS

Appendix F -- Impacts of Aircraft Noise on Humans

The impacts of aircraft noise upon human health were summarized in an EIS prepared by the Air Force regarding the proposed beddown of F-15E aircraft at Seymour Johnson AFB, North Carolina (USAF 1988a). The following discussion is an excerpt from this EIS.

The effect of noise on human health can generally be divided into three categories: physiological, behavioral, and subjective. The primary physiological concern with noise is hearing loss. Other physiological concerns have been included as nonauditory effects.

1.0 HEARING LOSS

Considerable data on hearing loss have been collected and analyzed. It has been well established that continuous exposure to high noise levels will damage human hearing (EPA 1978). People are normally capable of hearing up to 120 dB over a frequency range of about nine octaves. Hearing loss is generally interpreted as the shifting of a higher sound level of the ear's sensitivity or acuity to perceive sound. This change can either be temporary (TTS -- temporary threshold shift) or permanent (PTS -- permanent threshold shift) (Newman and Beattie 1985).

The EPA has set 75 dB for an 8-hour exposure and 70 dB for a 24-hour exposure as the average noise level standard requisite to protect 96 percent of the population from greater than a 5-dB PTS (Science Applications, Inc. 1980). While these standards have relevancy for planning, they in themselves are not necessarily appropriate land use planning criteria for controlling noise sources because they do not consider cost, feasibility, or the development needs of the community. The results of the three known studies on community hearing loss from exposure to aircraft flyovers near airports showed that there is no danger (under normal circumstances) of hearing loss due to aircraft noise (Newman and Beattie 1985). Individuals in two of the tests were exposed to a maximum level of 111 dB over 6-hour periods at a flyover rate of 40 events per hour.

2.0 NONAUDITORY EFFECTS

Studies have been produced to determine whether correlations exist between noise exposure and cardiovascular problems, achievement scores, birth weight, mortality rates, and psychiatric admissions. The nonauditory effect on humans of noise is not as easily proven as the effect on hearing. The results of studies done in the United States primarily concentrating on cardiovascular response to noise have been contradictory (USAF 1985).

Cantrell (1976) concluded that the results of human and animal experiments show that average or intrusive noise can act as a stress-provoking stimulus. Prolonged stress is known to be a contributor to a number of health disorders. Kryter (1980) states, "It is more likely that noise-related general ill-health effects are due to the psychological annoyance from the noise interfering with normal everday behavior, than it is from the noise eliciting, because of its intensity, reflexive response in the autonomic or other physiological systems of the body. The psychological stresses may cause a physiological stress reaction that could result in impaired health."

The National Insitute for Occupational Safety and Health and the EPA commissioned the Committee on Hearing, Bioacoustics, and Biomechanics (CHABA) to study the question of whether established noise standards were adequate to protect against health disorders other than hearing defects. CHABA's conclusion was that "evidence from available research reports is suggestive, but it does not provide definitive answers to the question of health effects, other than to the auditory system, of long-term exposure to noise. It seems prudent, therefore, in the absence of adequate knowledge as to whether or not noise can produce effects upon health other than damage to the auditory system, either

directly or mediated through stress, that insofar as feasible, an attempt should be made to obtain more critical evidence." CHABA also reported that "many of the available foreign studies could be criticized on a methodological basis (studies were not adequately controlled for other known risk factors)."

3.0 SPEECH INTERFERENCE

One of the most obvious effects of aircraft noise intrusion is speech interference. The disruption of leisure activities such as listening to the radio, television, music, and conversation is a primary source of annoyance, giving rise to frustration and irritation. In some situations, a high degree of intelligibility is essential to safety.

The frequency spectrum of speech covers the range from 100 to 6,000 Hz. The intensity level variation of successive sounds is equal to 30 dB. Speech is an acoustic signal characterized by rapid fluctuations in sound level and frequency pat' rn. It is essential for optimum speech intelligibility to recognize these continually shifting sound patterns. Not only does noise diminish the ability to perceive the auditory signal, but it also reduces a listener's ability to follow the pattern of signal fluctuation.

4.0 SLEEP INTERFERENCE

Sleep is not a continuous, uniform condition but a complex series of states through which the brain progresses in a cyclical pattern. There are basically five stages of sleep. Arousal from sleep is a function of a number of factors that include (1) age, (2) sex, (3) sleep stage, (4) noise lev-., (5) frequency of noise occurrences, (6) noise quality, and (7) presleep activity. Since there are extreme differences in the physiology, behavior, habitation, and adaptation to noise of individuals, few studies have attempted to establish noise criterion levels for sleep disturbance.

Some conclusions on the major determinants of human sleep response to noise drawn by Lukas (1972) include:

1. Children 5 to 8 years of age are generally unaffected by noise during sleep.
2. Older people are more sensitive to sleep disturbance than younger people.
3. Women are more sensitive to noise than men.
4. Within their own age group, there is a wide variation in the sensitivity of individuals to noise.
5. Sleep arousal is directly proportional to the sound intensity of aircraft flyover.

While there have been several investigations done to assess the effect of sircraft noise on sleep, none have produced quantitative dose-response relationships in terms of noise exposure level, L_{dn}, and sleep disturbance. Noise-sleep disturbance relationships have been developed based on single-event noise exposure.

The FAA has concluded from its research that "the physiological annoyance from the effects of sleep interference due to aircraft noise is probably more significant than the direct physiological consequences" (Newman and Beattie 1985). The effects of noise on sleep are not completely understood. There have been few studies done on the short- and long-term after-effects such as psychological and physiological disorders or task performance degradation during periods following sleep disturbance. Reasonable quality sleep is a requisite for good health.

5.0 PERFORMANCE EFFECTS

The effect of noise on the performance of activities or tasks has been the subject of many studies. Some of these studies have established links between continuous high noise levels and performance loss. Noise-induced performance losses are most frequently reported in those studies employing noise levels in excess of 85 dB. Little change has been found in low-noise cases. It has been cited that moderate noise levels appear to act as a stressor for more sensitive individuals performing a difficult psychomotor task.

The general effect of noise on performance is just beginning to be suggested from research studies (USAF 1985). The result have yet to yield definitive criteria with respect to the effect of periodic aircraft noise on performance. Several general trends that have developed are:

- o A periodic intermittent noise is more likely to disrupt performance than a steady-state continuous noise of the same level. Flyover noise, due to its intermittent nature, might be more likely to disrupt performance than a steady-state noise of equal level.
- o Noise is more inclined to affect the quality than the quantity of work.
- o Noise is more likely to impair the performance of tasks that place extreme demands on the worker.

Annoyance is the primary consequence of aircraft noise. The subjective impression of noise and the disturbance of activities are believed to contribute significantly to the general annoyance response. The feeling of annoyance is a complex response and when considered on an individual basis displays a wide availability for a given noise level. Research studies have found greater correlation by examining aggregate community annoyance to noise (Newman and Beattie 1985).

A number of nonacoustic factors have been identified that may influence the annoyance response of an individual. Newman and Beattie (1985) divided these factors into emotional and physical variables:

Emotional Variables

- o Feelings about the necessity or preventability of the noise.
- o Judgment of the importance and value of the activity that is producing the noise.
- o Activity at the time an individual hears the noise.
- o Attitude about the environment.
- o General sensitivity to noise.
- o Belief about the effect of noise on health.
- o Feeling of fear associated with the noise.

Physical Variables

- o Type of neighborhood.
- o Time of day.
- o Season.
- o Predictability of noise.
- o Control over the noise source.
- o Length of time an individual is exposed to a noise.

Most of the existing measures of community response to aircraft noise are based on the premise that the degree of annoyance experienced by a community as a whole can be adequately predicted by acoustic models. It has been found that in any community there will be a given percentage of the population highly annoyed, a given percentage mildly annoyed, and some who will not be annoyed at all (Newman and Beattie 1985). "The underlying assumption is that noise-exposed populations will experience similar reactions of annoyance when exposed to equivalent levels of noise" (Science Applications, Inc. 1980).

Table F-1

DEFINITION OF NOISE-RELATED TERMS

Term	*Definition of Noise-Related Terms*
Decibel (dB)	A unit describing the amplitude of sound, equal to 20 times the logarithm to the base 10 of the ratio of the pressure of the sound measured to the reference pressure, which is 20 micropascals (20 micronewtons per square meter).
dBA	The sound pressure level in decibels as measured on a sound level meter using the A-weighting filter network. The A-weighting filter deemphasizes the very low and very high frequency components of the sound in a manner similar to the frequency response of the human ear and correlates well with subjective reactions to noise. All sound levels in this report are A-weighted.
Day-night noise level (L_{dn})	The average A-weighted noise level during a 24-hour day, obtained after addition of 10 decibels to levels measured in the night between 2200 and 0700 hours. In general, an L_{dn} value of 65 dB is the noise level at which residential land use compatibility becomes questionable for structures with average or below average acoustic insulation.
L_{dnmr}	The onset-rate adjusted monthly day-night average A-weighted sound level. This metric was developed by the Armstrong Aerospace Medical Research Laboratory.
Equivalent noise level (L_{eq})	The average A-weighted noise level during (dBA) a 24-hour day, obtained after addition of 5 decibels to levels in the evening from 1900 to 2200 hours and after addition of 10 decibels to sound levels in the night between 2200 and 0700 hours.
Ambient noise level	The composite of noise from all sources near and far. The normal or existing level of environmental noise at a given location.

Table F-2

TYPICAL SOUND LEVELS MEASURED IN THE ENVIRONMENT AND INDUSTRY

At a Given Distance From Noise Source	*A-Weighted Sound Level in Decibels*	*Noise Environments*	*Subjective Impression*
	140		
Civil defense siren (100')			
	130		
			Pain
Jet takeoff (200')	120		threshold
	110	Rock music concert	
Pile driver (50')	100		Very loud
Ambulance siren (100')			
	90	Boiler room	
Freight cars (50')		Printing press plant	
Pneumatic drill (50')	80	In kitchen with garbage	
Freeway (10')		disposal running	
	70		Moderately
			loud
Vacuum cleaner (10')	60	Data processing center	
		Department store	
Light traffic (100')	50	Private business office	
Large transformer (200')			
	40		Quiet
Soft whisper (5')	30	Quiet bedroom	
	20	Recording studio	
	10		Threshold
			of hearing
	0		

Appendix G

CONTACT REPORTS

CONTACT REPORT

Date of Contact:	Meeting: January 25, 1989
Originator:	Traudt/Thomson/Moore
Person Contacted:	Lt.Col. John Dronenburg Range Control Officer Airburst Range, Colorado (719) 547-3988
Subject:	Current Range Operations

Airburst Range is not near capacity now. Has 21 scored targets in Impact Area 123. Range is designed to accommodate tactical aircraft; can also handle strategic aircraft. Three prime users (plus miscellaneous):

- Buckley ANG Base, CO; A-7 aircraft; 4 sorties per day, Tuesday through Saturday.
- Cannon AFB, NM; F-111 aircraft; 2 sorties per day.
- Kirtland AFB, NM; A-7 aircraft; 2 sorties on Saturdays.

Average of 10 passes on the range per A-7 sortie. Current use is 4 hours per day. Range is open Monday through Saturday, 0900 hours to usually not past 2100 hours. Crew is on split shift: 5 enlisted in A.M. and 5 enlisted in P.M. Range is slated for 11 enlisted plus 2 officers.

IR-409 is owned by Buckley ANG Base in Denver. Low-altitude release at 500' AGL. 8,500' AGL floor on commercial airway nearby. Lots of wind off the mountains, west-to-east and south-to-north.

Aircraft are currently dropping BDU-38 with large (long) footprint. Parachutes for BDU-38 are salvageable. EOD detachment for the range is at Ft. Carson. Current cleanup is once per year.

Road NE of target area is used by Army units; closed off during sortie runs. Stone City near the range is a ruin.

CONTACT REPORT

Date of Contact:	Meeting: January 26, 1989
Originator:	Traudt/Thomson/Moore
Person Contacted:	Charles W. Markl Range Operations Fort Carson, Colorado (719) 579-5811
Subject:	Issues at Airburst Range

Ft. Carson allows Air Force to use "safety fan" of 2,265 acres in SW portion through a memorandum of agreement. Ft. Carson is 137,400 acres; Airburst Range is 845 acres.

Army troops currently do tactical training (bivouacs) in target areas. Infantry, tanks, and personnel carriers pass through all day. Airburst Range causes very little inconvenience to Army training. The range is scheduled generally 30 days in advance, so Army can schedule 30-60-90 days in advance. When sorties are using the range, the Booth Gulch road by the base of Booth Mountain is closed.

Identified no significant environmental issues. Fremont County Airport to west of range may restrict SAC flight operations. Noise complaints have been received from Turkey Creek Ranch (Gary Walker) south of the range and residents of Penrose west of the range. Safety is the most important issue.

CONTACT REPORT

Date of Contact:	Meeting: January 26, 1989
Originator:	Traudt/Thomson/Moore
Person Contacted:	Steve Emmons Fish and Wildlife Specialist Environmental, Energy, and Natural Resources Division Fort Carson Directorate of Engineering and Housing Fort Carson, Colorado (719) 579-2022
Subject:	Threatened and Endangered Species in Project Area

Knows of no T&E impacts other than wintering bald eagles at Teller Reservoir (Area 52) on Turkey Creek. Some Peregrine falcons flying through the area. Black-footed ferrets known in the area, but none on Ft. Carson.

Ft. Carson has a total of about 40 prairie dog towns, most on the southern end of the base (10-20,000 acres). Ft. Carson is not currently a transfer site for prairie dogs. Other wildlife include deer (approx. 400 residents), elk (40-50 in 2-3 herds), coyote, some antelope. Most antelope are on Turkey Creek Ranch, not Ft. Carson. Noise may bother deer and elk.

No nesting raptors in immediate area. Golden eagles winter on Ft. Carson. Birds at Teller Reservoir include prairie falcons. red tails, barn owls, great horns ("everywhere"), and a few Swainson's hawks.

Hunting is allowed on Ft. Carson. Hunters check in daily and obtain range pass. No hunting is allowed when Army is maneuvering in the area. Fishing is allowed at Teller Reservoir. There are introduced (experimental) Greenback fish near Turkey Creek Ranch. Potential for listed Minnow below the reservoir in the Arkansas drainage.

CONTACT REPORT

Date of Contact: Meeting: January 26, 1989

Originator: Traudt/Thomson/Moore

Person Contacted: Mary Barber
Head of Environmental Section
Environmental, Energy, and Natural Resources Division
Fort Carson Directorate of Engineering and Housing
Fort Carson, Colorado
(719) 579-2022

Subject: Environmental Issues on Fort Carson

Ft. Carson prepared an EIS in 1979-1980, and Airburst has done two EAs.

Cultural resources: Historic Preservation Plan (1987) was done through State Historic Preservation Office (SHPO) in Denver. Ongoing historic/archaeological study of Stone City ghost town through the National Park Service in Denver. Stone City consists of abandoned mining equipment from early 1930s through 1950s; quarried sandstone, clay, gypsum; some prehistoric stuff found; potentially listed on NRHP.

Noise: AICUZ done for Ft. Carson (1985-1986). Noise monitoring network currently being developed.

Land Use: areas of concern are the Pueblo West suburban development, Gary Walker's ranch, and town of Penrose.

Air Quality: Colorado Springs is a nonattainment area for TSP (PM_{10}) and CO. Ft. Carson can't burn scrap weapons because of the phosphorus smoke produced; piles up weapons and sells as scrap metal instead. They may build a furnace in the future.

CONTACT REPORT

Date of Contact: Meeting: January 27, 1989

Originator: Sharon Traudt

Person Contacted: Capt. Steve Krikorian
Airspace Manager, Airburst Range and IR-409
Buckley ANG Base
Aurora, Colorado
(303) 340-9466

Subject: Current Use of Range and Route

IR-409 from Point A to Point G is infrequently used; only about 5 to 15 aircraft per month from Buckley and other bases. Other aircraft using the Airburst Range fly the mountain route, then enter IR-409 at Cedarwood (Point G). All aircraft accessing the range *must* fly at least the last leg of IR-409.

Noise complaints have come from towns of Penrose, Florence, and Canon City, and Gary Walker's ranch south of the range. Only a few noise complaints are received per year.

Birdstrikes are not a problem; only an occasional swallow. (Former safety officer Capt. Emil Lassen says 2-3 strikes in the last six months.)

Aircraft must fly the established left-turn racetrack for the range. The racetrack has been developed over several years to satisfy various airspace restrictions and noise complaints. Altitude within the Fremont MOA is surface to 8,500 feet MSL. Trying to implement instrument rules at the Fremont Airport.

He suggested I discuss airspace issues further with the Denver Center FAA.

CONTACT REPORT

Date of Contact:	Phone: July 12, 1989
Originator:	Sharon Traudt
Person Contacted:	MSgt. Joe Kinard Airburst Range, Colorado (719) 547-3988
Subject:	Current Use of Range and Route

Aircraft currently using the Airburst Range may use left or right pattern. Aircraft can fly to the right only when there is no tank fire on Ft. Carson; 99 percent use the left-traffic box pattern.

Range airspace is minimum 150 feet AGL to maximum 22,500 feet AGL. Aircraft currently fly at all different altitudes depending on exercise and aircraft type. A-7s fly at 150 to 200 feet AGL for pop-up, 1,000 feet AGL for practice bombing, and do 30-degree dive bombs. Typical altitude for strafing is 70 to 75 feet AGL. Most helicopters using the range are from Butts Field; 90 percent of helicopters hover at about 100 feet AGL and fire at targets.

He will send AFR 50-46 with range restrictions and flight altitudes. He suggested I call pilots at Buckley ANG Base for better description of current operations at the range, in the Fremont MOA, and on IR-409.

CONTACT REPORT

Date of Contact: Phone: July 18, 1989

Originator: Sharon Traudt

Person Contacted: Capt. Emil Lassen
IR-409 Route Scheduler for A-7s
Buckley ANG Base
Aurora, Colorado
(303) 366-9470

Subject: Current Use of Range and Route

Airburst Range is used for tactical deliveries. Aircraft follow tight patterns within R-2601, but usually no specific ground tracks. Typical mission consists of first-run attack.

Aircraft fly 1,000 feet AGL from Point G to Point I for noise abatement and to avoid birds on the Arkansas River. They fly in contact with Pueblo approach. After crossing Highway 50 just south of the range, aircraft descend to 300 feet AGL.

F-111 are the only routine range users; aircraft follow a left-track radar pattern established by Buckley. No right turn is allowed because aircraft would overfly noise-sensitive Teller Reservoir. Also, Army tanks fire live artillery (howitzers) into the red areas marked on Ft. Carson.

CONTACT REPORT

Date of Contact: July 18, 1989

Originator: Craig Bloxham

Person Contacted: Dana Christie
County Commissioner's Office
Baca County, Colorado
(719) 523-6532

Subject: Population Information for Baca County

Baca County contains isolated farm/ranch houses; no identified sensitive areas. Pritchett is the only town in that part of the county and it has 181 people. The county has only 4,642 people (1988). The county sheriff was there when I called and said that he hadn't heard of anyone complaining about existing flights. A rancher named Roy Brinkley was also in the office when I called. Roy lives in Pritchett and says he hardly ever notices the aircraft; they are no problem at all. Another rancher who lives in the area near Point E on the route concurred with Roy's assessment.

CONTACT REPORT

Date of Contact: Phone: November 30, 1989

Originator: Sharon Traudt

Person Contacted: Lt.Col. John Dronenburg
Range Control Officer
Airburst Range, Colorado
(719) 547-3988

Subject: Current Range Operations

Major users of the range are A-7s and F-111s with occasional F-16s. Once on the range, A-7s and F-16s stay in the target area at all times, circling around, usually for 20 to 30 minutes. Altitude varies from 100 to 3,000 feet AGL.

F-111s fly the racetrack radar pattern, climbing to approximately 8.500 feet MSL to enter Fremont MOA (minimum altitude in the MOA is 1,500 feet AGL). F-111 aircraft typically make 4 level passes on the range, following the racetrack, then at most 8 more diving passes. Diving passes vary from 100 to 3,000 feet AGL and are not restricted to the racetrack pattern.

Army helicopters (UH-1 and CH-47) also use the range. Typically two helicopters for 3 day stretch, 3 or 4 times per year. Helicopters hover at 200 to 300 feet AGL over the range and use machine guns out of side doors on target areas.

All aircraft using the range enter from the south on IR-409. Most converge at alternate entry Point G from other low-level routes. Ingress altitude is as low as 100 feet AGL (approximately 5,600 feet MSL). Ingress speed for A-7s, F-111s, and F-16s is 480 knots ground speed (approximately the same as KTAS).

Under the proposed action, B-1Bs would be flying to the east over two tank ranges on Ft. Carson. The planes would fly just south of one tank range but would overfly the eastern-most range. However, tanks in this area fire horizontally rather than into the air; he believes that B-1Bs would be at sufficiently high altitude to avoid danger of being hit. Ft. Carson still needs to sign off on the proposed action.

CONTACT REPORT

Date of Contact: December 1, 1989

Originator: Melissa Mooney

Person Contacted: Charlie Knight, Planning Officer
U.S. Forest Service
Pueblo, Colorado
(719) 545-8737

Subject: Forest Service management plans in southeastern Colorado

I called Charlie to request information about Pike and San Isabel National Forests, which lie to the west of the Fort Carson Military Reservation, and the Comanche National Grasslands, which lie underneath part of IR-409. The U.S.F.S. administers the National Grasslands. Charlie suggested I contact Charlie Richmond, the district ranger at Comanche NG, at (719) 523-6591. He may have a copy of an EA that was produced for the route, or be familiar with activity in that area. Headquarters for the National Grasslands are in Springfield, Colorado. Charlie agreed to send the Pike and San Isabel National Forest Plans, and species lists for Comanche National Grasslands.

CONTACT REPORT

Date of Contact: December 1, 1989

Originator: Melissa Mooney

Person Contacted: Melvin Nail, Manager
Alamosa/Monte Vista National Wildlife Refuge

Subject: Request for species lists

I called to request species lists for the wildlife refuges located in the San Luis Valley (west of the study area for the Airburst Range EA).

CONTACT REPORT

Date of Contact: December 1, 1989

Originator: Melissa Mooney

Person Contacted: Dave Kuntz
Colorado Natural Areas Program
Denver, Colorado
(303) 856-6587

Subject: Request for update on ecological literature for southeastern Colorado

Dave and I discussed the availability of literature and information regarding ecological resources in southeastern Colorado. He cited two references from Great Basin Naturalist that provide bibliographic references and a vegetation classification for the state (Baker 1984). The CNA Program is completing another vegetation classification for the state that is more detailed than Baker's (the one referred to above), at least for the eastern portion of the state (since Baker concentrated on the western slope).

Nancy Napp (866-6585) is the CNA data manager; if we need further information we could call her to request computerized searches for references on short-grass prairie.

When I asked about information for wildlife species, Dave suggested that I call Dave Lovell of the Colorado Division of Wildlife, in Colorado Springs. They have detailed information for wildlife species in the area, and can supply us with the necessary data.

CONTACT REPORT

Date of Contact: December 1, 1989

Originator: Melissa Mooney

Person Contacted: Charles Richmond
Comanche National Grasslands
Springfield, Colorado
(719) 523-6591

Subject: Request for Species Lists, Other Biological Information

Charles agreed to send species lists and biological information for the Comanche NG. He was not aware of any EAs that may have been completed for the route, but said he would check the files and get back to me.

CONTACT REPORT

Date of Contact: Telephone: December 4, 1989

Originator: Steve Ziemer

Person Contacted: Luis McBride
Colorado Department of Health
Air Pollution Control Division
Denver, Colorado
(303) 331-8594

Subject: Air Quality Information

Inquired about attainment status, SIP plans, and visibility in project areas of Colorado. Informed that all information could be obtained from two current reports: Colorado Air Quality Report to the Public - 1989; and Colorado Air Quality Data Report - 1988. Arrangements made to have these reports express mailed to our address.

CONTACT REPORT

Date of Contact: Phone: December 4, 1989

Originator: Sharon Traudt

Person Contacted: Lt.Col. John Dronenburg
Range Control Officer
Airburst Range, Colorado
(719) 547-3988

Subject: Noise Associated with Airburst Range

All planes using the range currently avoid towns and other noise-sensitive areas under the route corridor and centerline by horizontal separation. In particular, planes avoid ranch house of Turkey Creek Ranch (Gary Walker) just south of Fort Carson. They overfly Siloam, which consists of about 2 houses, at 1,000 feet AGL.

Planes also avoid town of Penrose west of Fort Carson, where most noise complaints come from. Airburst received 3 or 4 noise complaints in 1989 (maximum of 8). People sometimes call Fort Carson, so he suggested we speak to Nelson Kelm about noise and air quality issues: (719) 579-2282 or -4828.

No more recent noise surveys have been done since 1981.

CONTACT REPORT

Date of Contact: December 5, 1989

Originator: Craig Bloxham

Person Contacted: Carl Windsor
County Administrator
Prowers County, Colorado
(719) 336-9001

Subject: Population Information for Prowers County

In the northwestern part of the county where IR-409 starts, the area is primarily used for ranching and farming with a 10-mile-wide irrigated belt along the river where most of the homes would be. In the southwest, only ranching. The county population is about 13,800, with about 8,500 in Lamar, 500 in Wiley and about 50 in Kornman. [Note: according to the Lamar Chamber of Commerce, the county population is 14,200 at latest estimate (1988) and the Lamar population is 9,500 -- I'll go with these estimates]. The county has a rural population of 3,200 located mostly along the length of the Arkansas River. Carl knows of no complaints about current flights, some of which fly over the homes and ranches of some of their county commissioners.

CONTACT REPORT

Date of Contact: December 6, 1989

Originator: Melissa Mooney

Person Contacted: Dave Lovell, Wildlife Biologist
Colorado Division of Wildlife (CDOW)
Colorado Springs, Colorado
(719) 473-2945

Subject: Wildlife and Threatened and Endangered Species Information

Dave and I discussed data requests, contacts, and particular species known to reside in the study area. He needs a request in writing for information pertaining to wildlife in the area. Maps showing the route should be included in this data request. CDOW can supply us with maps showing distributions of big game species such as mule deer, pronghorn, and bighorn in the study area. Waterfowl areas can also be included. They have no long-billed curlew or white-faced ibis information. Information for federal candidate species such as the ferruginous hawk can be obtained from the raptor database. We may want to consider the white pelican in our report, since one of these birds "took down" a bomber in the area recently. There are also prairie chicken lek sites in the area. The prairie chicken is a state-threatened species. He suggested I contact Judy Shepard, CDOW in Denver for recent T/E information; Rita Green, the librarian at CDOW in Denver for lists of publications; the city of Denver (Denver Airport Office) for a copy of a recent report completed for a new Denver airport; and Doug Gladwin at the National Ecological Research Center in Fort Collins (303) 226-9100 for additional information.

CONTACT REPORT

Date of Contact: Phone: December 6, 1989

Originator: Sharon Traudt

Person Contacted: Capt. Emil Lassen
IR-409 Route Scheduler for A-7s
Buckley ANG Base
Aurora, Colorado
(303) 366-9470

Subject: Use of IR-409

Use of IR-409 from Point A to Point G depends on the particular exercise planned. Minimum usage is 16 to 20 planes per month; maximum is 60 to 80 per month during certain exercises. Typical airspeed for A-7s is 450 knots groundspeed.

Most aircraft use the route from Point G to Point I only. Two most utilized routes in the area are IR-415 and VR-413, followed by IR-409 and IR-412.

CONTACT REPORT

Date of Contact: December 6, 1989

Originator: Craig Bloxham

Person Contacted: Vicki Burkhard, County Planner
Pueblo County Department of Planning and Development
Pueblo, Colorado
(719) 545-2424

Subject: Population Information for Pueblo County

She will send me some published information soon. All of the towns I asked her about (Siloam, Swallows, Pinon, etc.) are not towns, per se. Mostly old historic places that may have thrived decades ago. Pinon, in particular, is a truck stop/commercial area with a restaurant. Nobody lives there that she is aware of.

CONTACT REPORT

e of Contact: December 6, 1989

Originator: Craig Bloxham

Person Contacted: Bob Knight, County Administrator
County Commissioner's Office
Otero County, Colorado
(719) 384-7787

Subject: Population Information for Otero County

The town of Bloom (which was my only concern in that county) is essentially nonexistent. He doubts if there is even a building there anymore. Maybe a ranch or two in the general area, but nothing that could be called a town. Nobody lives there that he is aware of. Mostly ranching (cattle) in the area. He sees no problem with additional flights, but expressed some concern about mishaps.

CONTACT REPORT

Date of Contact: December 6, 1989

Originator: Craig Bloxham

Person Contacted: Michael Ossola, County Planner
Las Animas County Planning Department
(719) 846-4486

Subject: Population Information for Las Animas County

He will send me some published information and land use maps soon. The total county population was 14,897 in 1980 and a slight decline has been estimated for 1987. The town of Kim had 100 people in 1980 and the 1987 projection made at that time was 111 people. Agriculture and ranching are the primary land uses. The other towns I asked about (Thatcher, Houghton, and Delhi) are not towns, per se. Few if any people still live there. Mostly old historic places that may have thrived decades ago but now have "two or three houses" each. The Comanche National Grassland is just that: set aside by the Government to be protected against certain land uses. It is not a fenced area and is probably used for cattle grazing.

A call to the Trinidad Post Office (Anita Guzzo, December 14, 1989), which delivers mail to the Thatcher, Delhi, and Houghton areas, verified what Michael had told me. Ms. Guzzo said that there are about 2 families in each of those "towns" and maybe about 10 people total.

CONTACT REPORT

Date of Contact:	December 7, 1989
Originator:	Craig Bloxham
Person Contacted:	Bill Giordano, County Planner and Betty Cornella, Business Manager Economic Development Council Fremont County, Colorado (719) 275-7510
Subject:	Population Information for Fremont County

The 1987 estimated population for Penrose unincorporated area is 4,000 and for Florence is 3,000. The total county population is 32,000. The Canon City area (including Lincoln Park, Brookside, and Park Center) is about 22,000. Mostly remote agricultural lands in the area. Some subdivisions with 35-acre parcels, mostly undeveloped. No complaints that he knows of since the changes were made to the F-111 racetrack.

I called Bill back on December 18th to ask about the Beaver Creek/Pinon Valley Subdivision and the Beaver Creek Heights subdivision in particular. He said they are divided into 35-acre parcels. There are 42 lots and 19 lots, respectively. Only about 20 to 30 lots (total) have been developed.

I also called the Ideal Cement Co. (784-6325) located in what shows up on the map as the town of Portland. They said that it used to be a company town but about 20 years ago people began leaving. Today there are no homes in the area and no one lives there. People commute to the plant from other communities (Penrose, Canon City, Pueblo, etc.).

CONTACT REPORT

Date of Contact: December 8, 1989

Originator: Melissa Mooney

Person Contacted: Bruce Rosenlund. Project Leader
Colorado Fish and Wildlife Assistance Office
Golden, Colorado
(303) 236-2675

Subject: Additional Information on Wildlife in the Study Area

Bruce and I discussed the Army's Pinon Canyon Maneuver Site, which underlies part of IR-409. Pinon Canyon was the site selected for use by the Army after the 1980 Dames and Moore EIS on alternative sites. The site was selected in 1983, and the next two years were spent producing studies of wildlife issues. Training began in 1985. The Army now performs fixed wing (C-130s), rotary (helicopters), and mechanized infantry maneuvers in the area. The Fish and Wildlife Service is in the process of producing a management plan for the area now. Bruce agreed to send a map of the area so I can see how it relates to the IR-409 corridor.

CONTACT REPORT

Date of Contact: Phone: December 11, 1989

Originator: Sharon Traudt

Person Contacted: Major Ronald Merrit
Head of BASH Team
HQ, U.S. Air Force
Washington, D.C.
(202) 767-9266

Subject: BASH and BAM Information

On IR-409, waterfowl near reservoirs are biggest concern. In vicinity of the range, need to watch for birds of prey. Biggest BASH concern for Airburst are the Sandhill Cranes and American White Pelicans in the area. Sandhill Cranes fly along the front range and migrate from New Mexico to Nebraska following the South Platte River. Pelicans are found at the John Martin Reservoir, particularly during spring and fall migration (1 month in September and October). Soaring raptors include turkey vultures and golden eagles mainly in wintering areas. It is almost impossible to avoid them ("see and avoid"). Vultures ride on thermals; usually fly in circles. Peak time: summer 9 to 11 A.M., 1 to 4 P.M. Arkansas River is slow just east of mountains; not major area for waterfowl.

BAM graphs are for waterfowl and some raptors only. The BAM graph for IR-409 includes turkey vultures; peak for 1988 is approximately 35 in December. BAM graph with a peak of less than 50 is not considered significant.

He suggested I speak with Fred Samec for records of bird-strikes on IR-409: (904) 871-2820.

CONTACT REPORT

Date of Contact: December 11, 1989

Originator: Craig Bloxham

Person Contacted: Nelson Kelm, Noise Specialist
Environmental, Energy, and Natural Resources Division
Fort Carson Directorate of Engineering and Housing
Fort Carson, Colorado
(719) 579-2282

Subject: Noise Complaints Associated with Airburst Range

Mr. Kelm is involved in setting up a noise monitoring network on Fort Carson (based on C-weighted measurement), but his activities do not really focus on the range. He suggested that noise from helicopters is a problem along Hwy 115 and that problems near Penrose have diffused in recent years. He'll be setting up portable monitors in the Penrose area in the next month or so.

CONTACT REPORT

Date of Contact: December 12, 1989

Originator: Craig Bloxham

Person Contacted: J.D. Henrich, County Zoning Officer
Custer County, Colorado
(719) 783-2669

Subject: Population Information for Custer County

Wetmore is the only town in the affected area, Greenwood is just a subdivision now; it used to be a town, too. Maybe about 100 people combined. No known complaints or problems.

CONTACT REPORT

Date of Contact: December 13, 1989

Originator: Melissa Mooney

Person Contacted: Dave Lovell, Wildlife Biologist
Colorado Division of Wildlife
Colorado Springs, Colorado
(719) 473-2945

Subject: Additional Wildlife Questions

I called to verify Dave's receipt of the data request that I sent out last week. He said he had received it and asked what form we would prefer to have the information in. He said he could transfer information onto our route maps, if necessary.

I asked specifically for information about the least tern and other federal candidate birds; he suggested I contact Mike Carter, Director of the Colorado Bird Observatory, Brighton, Colorado (303) 659-4348. Mike has completed reports concerning the least tern and piping plover and could provide me with specific info. Dave suggested again that I try to get a copy of the Stapleton Airport draft and final EIS, since they addressed birds in that document.

We discussed migration routes in the area; most birds migrate north to south in the fall and northward again in the spring. They also move from concentration areas to feeding areas, and with a greater distances between these two areas, birds are likely to fly at higher altitudes (anywhere from 200 to 2,000 feet).

Bighorn sheep may be present in the study area. Wintering bald eagles can be seen along the Arkansas River, maybe the Cucharas. They concentrate in open water areas where they can feed on waterfowl. He also reported that the Arkansas River is a good quality fishing river in the vicinity of Canon City and Pueblo.

Jenny Slater, CDOW terrestrial biologist in Lamar, can fill in data gaps in their file information.

CONTACT REPORT

Date of Contact: December 13, 1989

Originator: Melissa Mooney

Person Contacted: Judy Shepard
Colorado Division of Wildlife
Denver, Colorado
(303) 291-7272

Subject: Update on status of threatened and endangered species in Colorado

I called to find out if the CDOW publication on essential habitat for endangered species in Colorado had been updated recently. Judy said a published version had not been produced, but that status changes have occurred. She verified current status for many of the species occurring in the Airburst study area. The least tern and the piping plover are two species added to the list since the 1978 publication. Both are state-endangered species. The white pelican is no longer a state-threatened species, but is now a species of special concern. Species of special concern are those that have been delisted within the past five years. All non-game species in the state are protected; threatened and endangered species are given additional protection. Judy agreed to send updated lists of endangered and threatened species in the state, along with the appropriate regulations protecting them.

CONTACT REPORT

Date of Contact: December 13, 1989

Originator: Craig Bloxham

Person Contacted: Capt. Steve Krikorian
Airspace Manager, Airburst Range and IR-409
Buckley ANG Base
Aurora, Colorado
(303) 340-9466

Subject: Noise Complaints Associated with Airburst Range

Capt. Krikorian said that historically Penrose has been the source of 98 percent of all complaints and that 90 percent of those were from the same person. He did not know whether this person was acting as a spokesperson for others in the community or was just extremely concerned. Since early 1980s, however, when the F-111 flightrack and altitude were changed, there have only been about 5 complaints per year. During special activities (i.e. close air support at Fort Carson) they get more complaints. He doesn't see too much problem with the B-52s coming through, especially if they are not at full power. At full power, some complaints might be generated. But arrangements would be made in that event; similar to the F-111 mitigations.

CONTACT REPORT

Date of Contact: December 14, 1989

Originator: Melissa Mooney

Person Contacted: Mike Carter, Director
Colorado Bird Observatory
Brighton, Colorado
(303) 659-4348

Subject: Distribution of Federal Candidate Species

I called to check on the distribution of the least tern, the piping plover, and western snowy plover in the study area. Mike reported that all three migrate through the area during the spring and fall. The least tern nests in two areas in eastern Colorado: on an island in Adobe Creek Reservoir (also known as Blue Lake), and at Nee Noshe Reservoir. This is the first documented nesting in this area in 40 years. Two pair were successful in rearing 40 young. The piping plover also nests at Nee Noshe Reservoir. The western snowy plover is common in lakeshore habitats; it also nests in the area.

There are no documented hawk migration corridors in eastern Colorado; Mike speculated that they migrate over broad areas. There are no data available at this time. Mike agreed to send additional information on the Colorado Bird observatory.

CONTACT REPORT

Date of Contact: December 14, 1989

Originator: Melissa Mooney

Person Contacted: Steve Emmons, Fish and Wildlife Specialist
Environmental, Energy, and Natural Resources Division
Fort Carson Directorate of Engineering and Housing
Fort Carson, Colorado
(719) 579-2022

Subject: Specific Information on Wildlife in Vicinity of Airburst Range

I called Steve to check on the occurrence of bald eagles, bighorn sheep, and raptors in the area near the Airburst Range. One to two bald eagles regularly occur at Teller Reservoir (east of the range) in the winter. They usually arrive in November or December and stay until March.

There are no bighorn on Fort Carson, but they are present in the mountains next to Fort Carson, and they may have been transplanted to the Pinon Canyon site (under IR 409) Raptors are not known to nest in the immediate vicinity of Range 123 (Airburst Range), but golden eagles and ferruginous hawks do nest in other areas on Fort Carson. Golden eagles nest near Teller Reservoir. Pinon Canyon is a concentration area for ferruginous and Swainson's hawks. There has been a great deal of research performed on raptors in this area because of the Army's maneuvering and training activities. Reports could be obtained from Dr. David Anderson, Assistant Cooperative Unit Leader, Minnesota Cooperative Research Unit, Department of Fish and Wildlife, University of Minnesota, 200 Hodson Hall, 1980 Folwell Avenue, St. Paul, Minnesota, 55108.

CONTACT REPORT

Date of Contact: December 14, 1989

Originator: Craig Bloxham

Person Contacted: Lt.Col. John Dronenburg
Range Control Officer
Airburst Range, Colorado
(719) 547-3988

Subject: Noise Complaints Associated with Airburst Range

In the late 1970s and early 1980s, F-111 operations were less restricted, and the range would get as many as one or two complaint calls per flight. So Lt. Col. Dronenburg and Cannon AFB (home of the F-111s) personnel worked out mitigations (8,500 MSL descending to 8,000 MSL on return leg, specific ground track to follow to avoid Penrose as much as possible, i.e. the current procedures). Since that time (about 1981), there have been very few complaints (about 5 per year, maybe more if special exercises come through). He believes that the B-52s don't necessarily have to follow the same altitude restrictions as the F 111s and that the proposed 1,500 feet AGL would be acceptable to Penrose residents. If not, he would negotiate with SAC to change flight procedures until the problems are mitigated. He said that the old problems were partially due to the fact that Penrose residents weren't used to the flights but that now, after 10 years of flying out there, they're not a problem. Once a month or so, close air support exercises are run on Fort Carson. These don't have anything to do with the range but generate a lot of noise. Combined with artillery, tanks, and choppers, which are all sources of noise at Penrose, these activities generate more complaints than simple bombing practice at the range.

CONTACT REPORT

Date of Contact: Telephone: December 19, 1989

Originator: Melissa Mooney

Person Contacted: Dave Lovell, Wildlife Biologist
Colorado Division of Wildlife
Colorado Springs, Colorado
(719) 473-2945

Subject: Further data on Biological Resources

Dave called me to request a better map for plotting species localities. We finally agreed that he should send data at the 1:250,000 scale on a county basis. To reduce costs, I suggested concentrating on bird species, especially raptors. Data are not available for some species, such as ferruginous hawks. I should talk to Judy Shepard or Gerry Craig in Fort Collins for that information (raptor biologists).

- Mule deer and pronghorn are present in all five counties.
- There are no elk near the corridor.
- The peregrine falcon has been reintroduced at some historically-documented sites.

CONTACT REPORT

Date of Contact: Telephone: December 20, 1989

Originator: Steve Ziemer

Person Contacted: Bill Hargraves
New Mexico Air Quality Bureau
Santa Fe, New Mexico
(505) 827-0062

Subject: Air Quality Information

Union and Colfax Counties are in attainment for all air quality standards. Nearest PSD Class I area to the project area is the Wheeler Peak Wilderness Area located approximately 10-15 miles northeast of Taos, New Mexico.

CONTACT REPORT

Date of Contact: Telephone: December 20, 1989

Originator: Melissa Mooney

Person Contacted: Gary Belew, Range Conservationist
Environmental, Energy, and Natural Resources Division
Fort Carson Directorate of Engineering and Housing
Fort Carson, Colorado
(719) 579-2022

Subject: Vegetation, T/E plants near Airburst Range

Gary wasn't specifically familiar with vegetation in the vicinity of impact area 123. He did say that no surveys for T/E plants have been done on Fort Carson. One state-protected and federal candidate (C2) plant species could potentially occur on the base: *Haplopappus fremontii* var. *monocephalus*. This taxon is known to occur at Pinon Canyon.

CONTACT REPORT

Date of Contact:	Telephone: December 21, 1989
Originator:	Melissa Mooney
Person Contacted:	Bruce Rosenlund, Project Leader Colorado Fish and Wildlife Assistance Office Golden, Colorado (303) 236-2675
Subject:	Pinon Canyon Maneuver Site (PCMS)

I phoned Bruce to inquire about raptors on the PCMS. After receiving the map of the site that he sent last week, I noticed a number of nesting localities. Swainson's, rough-legged, and red-tailed hawks are present in the area, in addition to ferruginous hawks and golden eagles. Ferruginous hawks and red-tailed hawks are the most abundant. There have been no peregrine reintroductions, though one was sighted a few years back. The name Pinon Canyon comes from an old ghost town on the southern edge of the site; there is no Pinon Canyon on any maps. Bruce is sending the Fish & Wildlife Management Plan for the site (received 12/27/89). He suggested that I contact David Anderson at the University of Minnesota for research reports from the area (612) 626-1222.

CONTACT REPORT

Date of Contact:	Telephone: January 16, 1990
Originator:	Melissa Mooney
Person Contacted:	Jenny Slater, Biologist Colorado Department of Wildlife Lamar, Colorado (719) 336-3505 (home); (719) 336-4852 (office)
Subject:	Further site-specific data on bald eagle, other species within Airburst study area

Bald eagles in this area winter primarily along the Arkansas and Purgatoire rivers. Two Buttes Reservoir is now dry, and few eagles are seen there anymore. Six to ten eagles winter along Two Buttes Creek, which drains into the reservoir. More than 60 eagles were seen along the Arkansas this winter (from Pueblo to the border). About eight are wintering at John Martin Reservoir now. Jenny wasn't aware of any surveys along the Purgatoire River.

Ferruginous hawks are present in the area in summer and winter; they are scattered throughout the area. Jenny had no information on nest localities.

We discussed the introduced populations of Rocky Mountain bighorn. There are three primary locations: (1) canyons of West Carrizo and Cottonwood creeks; (2) canyons along the Purgatoire and Chacuaco creeks and near their confluence; and (3) Apishapa Canyon. The population near West Carrizo is hunted now.

There isn't much water south of the Arkansas River, thus there is little habitat for piping plovers and least terns.

CONTACT REPORT

Date of Contact: Telephone: January 19, 1990

Originator: Melissa Mooney

Person Contacted: Mark Elkins, Senior Biologist
Colorado Division of Wildlife
(719) 473-2945

Subject: Bighorn Sheep Reintroduction Areas

I called Mark to find out when bighorn reintroductions occurred at the three locations within the Airburst study area and how large the populations are. The following information was relayed to me:

	Location	*Date*	*Pop. Estimate*	*Pop. Condition*
1)	Apishapa Canyon	1977	75 head	~stable; hunted
2)	West Carrizo	1980	45 head	~stable; hunted
3)	Purgatoire Canyon	1982	100 head	increasing; not hunted

The above population estimates are from recent ground observations.

CDOW bighorn sheep management objectives are to (1) reestablish bighorn in their historic range; (2) maximize the bighorn population in the State; and (3) reestablish huntable populations.

There are no studies of overflight effects on bighorn in this area. PCMS was established prior to the reintroduction of bighorn into that area, and most canyon areas where they reside are off-limits to training.

Appendix H

CORRESPONDENCE

COLORADO
HISTORICAL
SOCIETY

The Colorado History Museum 1300 Broadway Denver, Colorado 80203-2137

January 18, 1989

George H. Gauger
Acting Chief, Environmental Planning
DCS/Engineering and Services
Department of the Air Force
Offutt Air Force Base, Nebraska 68113-5001

Re: SAC Low-level Training Route IR-409

Dear Mr. Gauger,

This is to acknowledge receipt of your January 13, 1989 correspondence concerning the above training route.

Date Received: January 17, 1989

Thank you for the opportunity to comment on this action. Because this project apparently will not affect cultural resources, this office has no comment to make at this time.

If we can be of further assistance, please contact our Technical Services Division at 866-3392.

Sincerely,

Barbara Sudler
State Historic Preservation Officer

BS/WJG

UNITED STATES
DEPARTMENT OF THE INTERIOR
FISH AND WILDLIFE SERVICE
Ecological Services
Suite D, 3530 Pan American Highway, NE
Albuquerque, New Mexico 87107

Cons. #2-22-89-I-049

January 23, 1989

Headquarters Strategic Air Command
Department of the Air Force
Attn: Ms. Sheri Rivera, HQ SAC/DEVP
Offutt Air Force Base, Nebraska 68113-5001

Dear Ms. Rivera:

This responds to your letter dated January 13, 1989, requesting information on the effects of Strategic Air Command low-level training on species Federally listed or proposed to be listed as threatened or endangered. The proposed action involves low-level flights over an existing Air National Guard route (IR-409). The route of concern to this office is that portion of IR-409 in northern Union County, New Mexico.

We have used the information in your request to narrow the list of species occurring in the project area to those which may be affected by your proposed action. Our data indicate no listed species would be affected by the proposed action in New Mexico. To expedite the response, additional information on wildlife resources within the boundaries of Route IR-409 in New Mexico should be directed to this office rather than the Regional Office.

We suggest you contact the New Mexico Department of Game and Fish and the New Mexico Energy, Minerals and Natural Resources Department for information concerning fish, wildlife and plants of State concern.

If we can be of further assistance, please call Mike Donahoo at (505) 883-7877 or FTS 474-7877.

Sincerely yours,

John C. Peterson
Field Supervisor

cc:
Director, New Mexico Department of Game and Fish, Santa Fe, New Mexico
Director, New Mexico Energy, Minerals and Natural Resources, Forestry Division, Santa Fe, New Mexico
Regional Director, U.S. Fish and Wildlife Service, Fish and Wildlife Enhancement, Denver, Colorado
Regional Director, U.S. Fish and Wildlife Service, Fish and Wildlife Enhancement, Albuquerque, New Mexico

GARREY CARRUTHERS
GOVERNOR

STATE OF NEW MEXICO
OFFICE OF CULTURAL AFFAIRS
HISTORIC PRESERVATION DIVISION
VILLA RIVERA ROOM 101
228 EAST PALACE AVENUE
SANTA FE NEW MEXICO 87503
(505) 827-8320

THOMAS W. MERLAN
DIRECTOR

HELMUTH J. NAUMER
CULTURAL AFFAIRS OFFICER

January 31, 1989

Mr. George H. Gauger
Acting Chief
Environmental Planning
DCS/Engineering and Services
Headquarters Strategic Air Command
ATTN: HQ SAC/DEVP (Ms. Sheri Rivera)
Offutt Air Force Base, Nebraska 68113-5001

Re: SAC Low Level Training Route IR-409

Dear Mr. Gauger:

At your request, I have reviewed the proposal by the United States Air Force, Strategic Air Command, to utilize an existing low level training route, IR-409, for SAC low level training exercises by B-52 and B-1B aircraft flying a maximum of 40 sorties per week at subsonic speeds. The purpose of my review is to determine what effect the proposed undertaking may have on significant cultural resources located within the State of New Mexico.

No properties entered in or determined eligible for inclusion in the National Register of Historic Places are located in that portion of northern Union County crossed by IR-409. In addition, I am not aware of any potentially eligible buildings or structures located in the vicinity of the training route that may be affected by the proposed exercises. Significant archaeological sites known to exist in this area will not be affected by subsonic overflights. It is therefore my opinion that the described undertaking will have no effect on any historic properties.

Thank you for the opportunity to consult with you on the proposed training exercises. Provided that you have no further questions regarding my comments, this determination of no effect should conclude our consultation on this matter.

Sincerely,

Thomas W. Merlan
State Historic Preservation Officer

TWM.DER:bc/Log 18008

United States Department of the Interior
NATIONAL PARK SERVICE
ROCKY MOUNTAIN REGIONAL OFFICE
12795 W. Alameda Parkway
P.O. Box 25287
Denver, Colorado 80225-0287

TAKE PRIDE IN AMERICA

IN REPLY REFER TO

L7619 (RMR-PP)

FEB 7 1989

Mr. George H. Gauger
Acting Chief, Environmental Planning
DCS/Engineering and Services
Department of the Air Force
Headquarters Strategic Air Command
Offutt Air Force Base, Nebraska 68113-5001

Dear Mr. Gauger:

Our office has reviewed the low-level training route IR-409 which will be used by the Strategic Air Command (SAC). The nearest Rocky Mountain Regional Unit of the National Park System to this route is Bent's Old Fort National Historic Site. The flight corridor appears to pass no closer to Bent's Old Fort than approximately 30 miles and should not have any effect on it.

We appreciate the opportunity to review this SAC training route.

Sincerely,

Richard A. Strait
Associate Regional Director
Planning and Resource Preservation

United States Department of the Interior
NATIONAL PARK SERVICE
SOUTHWEST REGION
P O BOX 728
SANTA FE, NEW MEXICO 87504-0728

TAKE PRIDE IN AMERICA

IN REPLY REFER TO

L7619(SWR-PPE)

FEB - 1989

Mr. George H. Gauger
Acting Chief, Environmental Planning
HQ SAC/DEVP
Offutt Air Force Base, Nebraska 68113-5001

Dear Mr. Gauger:

This responds to your request for our review of project information concerning route IR-409, Colorado and New Mexico. On a technical assistance basis, we find that use of IR-409 should not impact any present, proposed or potential unit of the National Park System, the National Wild and Scenic Rivers System or the National Trails System. Capulin Volcano National Monument is in the vicinity of the route, but we do not anticipate any adverse impacts to the monument.

We appreciate the opportunity to provide this technical assistance.

Sincerely,

Associate Regional Director,
Planning and Resources Management,
Southwest Region

cc:
Superintendent, Capulin Volcano

United States Department of the Interior

FISH AND WILDLIFE SERVICE
COLORADO FIELD OFFICE
730 SIMMS STREET
ROOM 292
GOLDEN, COLORADO 80401

IN REPLY REFER TO:

FEB 13 1989

Headquarters Strategic Air Command
Department of the Air Force
Attn: Ms. Sheri Rivera, HQ SAC/DEVP
Offutt Air Force Base, NE 68113-5001

Dear Ms. Rivera:

As requested in your letter of January 13, 1989, the Colorado State Office of the Fish and Wildlife Service (Service) has compiled the following information on significant wildlife resources which may be within IR-409. In addition, we recommend that you contact the Project Leader, Colorado Fish and Wildlife Assistance Office, for additional data on wildlife disturbance from military training activities. That office has been monitoring interactions between wildlife and military activity at the Department of the Army's Pinon Canyon Maneuver Site in southern Colorado. The Pinon Canyon site is located within the boundary of IR-409. The data which has been collected at Pinon Canyon may prove useful in preparation of the Environmental Assessment. The Colorado Fish and Wildlife Assistance Office is located at 730 Simms Street, Room 290, Golden, Colorado 80401.

Federally listed threatened and endangered species which may occur within IR-409 are listed below. The potential effects of the proposed training on these species should be evaluated.

FEDERALLY LISTED SPECIES, COLORADO
November 1988

Species

Birds:	Peregrine falcon (Falco peregrinus)
	Bald eagle (Haliaeetus leucocephalus)
	Least tern (Sterna antillarum)
	Whooping crane (Grus americana)
	Piping plover (Charadrius melodus)

Section (7c) of the Endangered Species Act requires that the Federal agency proposing a major Federal action significantly affecting the quality of the human environment to conduct and submit to the Service a biological assessment to determine effects of the proposal on listed species. The biological assessment shall be completed within 180 days after the date on which initiated or a time mutually agreed upon between the agency and the Service. The assessment must be completed before physical project modification/

alteration begin. If the biological assessment is not begun within 90 days, the species list above should be verified prior to initiation of the assessment.

The lead Federal agency should evaluate the potential impacts of the proposed action and determine if the action may affect any listed species. If a determination is "may affect" for listed species, the Federal agency must request in writing a formal consultation from this office and should provide this office with a biological assessment and any other relevant information used in making impact determinations.

The Fish and Wildlife Service (Service) would like to bring to your attention species which are candidates for official listing as threatened or endangered species (Federal Register, Vol. 40, No. 181, September 18, 1985, Vol. 50, No. 188, September 27, 1985). While these species presently have no legal protection under the Endangered Species Act (Act), it is within the spirit of the Act to consider project impacts to potentially sensitive candidate species. Additionally, we wish to make you aware of the presence of Federal candidates should any be proposed or listed prior to the time that all Federal actions related to the project are completed.

CANDIDATE SPECIES AS OF 1/6/89

CATEGORY	COMMON NAME	SCIENTIFIC NAME
Birds		
2	White-faced ibis	Plegadis chihi
2	Ferruginous hawk	Buteo regalis
2	Western snowy plover	Charadrius alexandrinus nivosus
2	Mountain plover	Charadrius montanus
2	Long-billed curlew	Numenius americanus

If we can be of further assistance, please contact Bill Noonan of my staff at FTS 776-2675 or Comm. 303-236-2675.

Sincerely;

LeRoy W. Carlson

LeRoy W. Carlson
State Supervisor

GOVERNOR

DIRECTOR AND SECRETARY
TO THE COMMISSION
BILL MONTOYA

State of New Mexico

DEPARTMENT OF GAME AND FISH

VILLAGRA BUILDING
SANTA FE
87503

STATE GAME COMMISSION

GERALD MAESTAS CHAIRMAN
ESPAÑOLA

RICHARD A ALLGOOD
SILVER CITY

CHRISTINE D GREGORIO
GALLUP

THOMAS P ARVAS O D
ALBUQUERQUE

BOB JONES
DELL CITY TX

February 22, 1989

Mr. George H. Gauger, Acting Chief
Environmental Planning
USAF-Headquarters Strategic Air Command
Offutt Air Force Base, Nebraska 68113-5001

Dear Mr. Gauger:

The New Mexico Department of Game and Fish has received your request for information on fish and wildlife resources that could be impacted as a result of proposed low-level military flights. We understand that this information will be used by the Air Force in preparing an environmental assessment for the Strategic Air Command (SAC).

The SAC is proposing to conduct low-level, subsonic speed flights utilizing an existing route (IR-409) that traverses a portion of Union County in northeastern New Mexico. This would allow SAC low-level training and access to the Airburst Weapons Range in Colorado. The B-52 aircraft will fly a maximum of 20 sorties/week, at an average speed of 340 KTAS, and minimum altitude of 1,000 feet. The B-1 aircraft will fly a maximum of 20 sorties/week, at an average speed of 550 KTAS, and a minimum altitude of 1,000 feet. Eighty percent of the activity will take place at night.

The Department of Game and Fish has reviewed the proposed action in terms of its potential effects on state-listed threatened and endangered species, streams and wetlands, and other fish and wildlife resources of concern to the state. Considering the location and scope of the proposed activity, we find no adverse effect on these resources, and therefore, we hereby issue a finding of no significant impact.

Thank you for the opportunity to review and comment on this proposal. If you have any questions, please feel free to call Andrew Sandoval (827-7952) of this department.

Sincerely,

Bill Montoya
Director

Lewis A Quigley
Co-Executive Director

James E. Spaccamonti
Co-Executive Director

Charles J Finley
Director/Manager

PACOG

- County of Pueblo
- City of Pueblo
- Pueblo Board of Water Works
- School District No. 60
- School District No 70

PUEBLO AREA COUNCIL OF GOVERNMENTS

c/o Pueblo County
Department of Planning and Development
1120 Court Street
Pueblo, Colorado 81003-2889
(719) 545-2424

March 27, 1989

Ms. Sheri Rivera
Headquarters SAC/DEVP
Offutt Air Force Base, NE 68113-5001

Re: Aircraft Training Route IR-409
SAC Low-Level Training and Access

Dear Ms. Rivera:

We have received the scoping notice for the proposed Strategic Air Command (SAC) low-level training and access project regarding the Airburst Weapons Range in Colorado. Per the notice, the United States Air Force will prepare an environmental assessment for the use of the proposed route and range.

The Pueblo Area Council of Governments (PACOG) requests that it be included in the review and comment process for this project. Documentation and related information may be sent to:

Pueblo Area Council of Governments
c/o Department of Planning and Development
1120 Court Street
Pueblo, Colorado 81003-2889
Attention: Ms. Vicki J. Burkhard

If you have any questions, please do not hesitate to contact Ms. Burkhard or me.

Sincerely,

Charles J. Finley
PACOG Director/Manager

CJF:VJB:lr

c: Mr. James E. Spaccamonti, PACOG Co-Executive Director
Mr. Lewis A. Quigley, PACOG Co-Executive Director
Mr. Thomas Jagger, PACOG Attorney
Mr. Jim Munch, City of Pueblo
Mr. Harold A. Miott, Director, Colo. Dept. of Local Affairs

SAIC
Science Applications International Corporation
An Employee-Owned Company

December 7, 1989

Mr. Dave Lovell
Colorado Division of Wildlife
2126 North Weber
Colorado Springs, Colorado 80907

Dear Dave:

As we discussed on Wednesday, SAIC is assisting the U.S. Air Force in the preparation of an environmental assessment of a proposal to use a portion of the the Fort Carson Military Reservation (the Airburst Range) and a military training route (IR-409) in southeastern Colorado for low-altitude training exercises. Fort Carson and its associated military operations area is located in El Paso, Pueblo, Teller, and Fremont counties; the proposed training route IR-409 is located primarily in Pueblo, Las Animas, Baca, and Prowers counties. As part of the proposed action, training aircraft would access the Airburst range via IR-409, flying between 400 and 1,000 feet above ground level. Enclosed please find a project map and a series of strip maps showing the route of IR-409 in southeastern Colorado.

I would greatly appreciate any distributional information you could provide for wildlife species in this area, especially big game species such as pronghorn, bighorn sheep, and mule deer. I would also appreciate information pertaining to sensitive raptors or waterfowl concentration areas in this vicinity.

I have contacted the Denver office and hope to be receiving three of the latilong studies pertaining to mammals, reptiles and amphibians, and birds, in addition to publications on Colorado's wetlands and wildlife management areas. Any further information you can supply would be greatly appreciated.

Thank you for your time; if you have any questions please don't hesitate to call me at (805) 966-0811.

Sincerely,

Melissa J. Mooney
Senior Biologist

United States Department of the Interior

FISH AND WILDLIFE SERVICE
COLORADO FIELD OFFICE
730 SIMMS STREET
ROOM 292
GOLDEN, COLORADO 80401

IN REPLY REFER TO:

December 11, 1989

Ms. Melissa Mooney
SAIC
1421 Chapala Street
Santa Barbara, California 93101

Subject: Map of Pinon Canyon

Dear Ms. Mooney:

Concerning your request for information on Pinon Canyon, Colorado, enclosed is a copy of the Pinon Canyon map.

If you also determine that additional information is required from us, we can possibly provide you with a draft copy of the Pinon Canyon Fish and Wildlife Management Plan by next week.

Sincerely,

Bruce D. Rosenlund

Bruce D. Rosenlund
Project Leader

Enclosure

DEPARTMENT OF PLANNING AND DEVELOPMENT
1120 COURT STREET • PUEBLO COLORADO 81003-2889 • (719) 545-2424

December 12, 1989

Mr. Craig Bloxham
Science Applications International Corporation (SAIC)
1421 Chapala Street
Santa Barbara, CA 93101

RE: Request for Information - Environmental/Socio-Economic Data
Project: Fort Carson Training Flights

Dear Mr. Bloxham:

Per your request, I have attempted to gather some generic information related to your areas of concern regarding the above-referenced project. Please note that in all cases, more detailed information about these areas from which to draw specific conclusions related to your project would be your responsibility. Enclosed please find the following information:

1. Map of Pueblo County

I have drawn in areas of specific interest. Please note that the areas about which you inquired, i.e., Swallows, Siloam, Goodpasture and Cedarwood, are not cities or incorporated towns. They are delineated on the map for you as general areas. There is minimal development associated with each area, except for the small mountain community of Beulah, which is near the Goodpasture area shown on your maps. Generally, the areas with which you should be concerned are Pueblo West, the Town of Boone (incorporated), and Colorado City.

Regarding your question on Valley View, please note that Valley View Estates is a subdivision of record (December, 1902) and is located in Section 10, Township 23 South, Range 68 West. It is located south of the Town of Beulah.

2. City of Pueblo Data Book (1989)

I have enclosed a loan copy of the referenced document. Please return this copy to our office when you are finished.

3. Pueblo Regional Comprehensive Development Plan (October 1980)

I have enclosed a copy of the Table of Contents and Section VI-G, Environmental Quality Element, Noise Section. Also included is the Pueblo County Plan Map. The Land Use Legend is difficult to read; however, I have reproduced the legend categories in items 1 through 15 above the map.

4. 208 Areawide Water Quality Management Plan, 1987 Update

Enclosed are copies of population data taken from the referenced document for the following areas: Pueblo West, City of Pueblo, Town of Boone, and Colorado City Metropolitan District.

5. Noise Sensitivities/Complaints

I talked with Mr. Avery Wyant of the Pueblo City-County Health Department regarding this inquiry. Mr. Wyant noted that he was unaware of any specific noise complaints regarding Fort Carson operations within the past five years. He further noted that complaints are usually related to artillery and explosives rather than aircraft.

I have also attached a list of persons to contact should you need additional information. As we discussed, I have ordered the set of U.S. Geological Survey land use maps for Pueblo County. We will bill you separately for the blue-line prints and copying charges for items contained herein.

Please call me if you have any questions or if you need additional information. I hope this is of some assistance to you. Please place the Pueblo County Department of Planning and Development on the mailing list of reviewing agencies for this project, if it hasn't been done already. Thank you.

Sincerely,

Vicki J. Burkhard
Planner II/Environmental Planner

Attachment: List of Contacts
Enclosures: Various

VJB:vjb

DM:MISC
FN:ftcarsnenvirondata

STATE OF COLORADO
Roy Romer, Governor
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF WILDLIFE
AN EQUAL OPPORTUNITY EMPLOYER
James B. Ruch, Director
6060 Broadway
Denver, Colorado 80216
Telephone: (303) 297-1192

REFER TO

13 December 1989

Ms. Melissa J. Mooney
Senior Biologist
SAIC
1421 Chapala Street
Santa Barbara, CA 93101

I am in receipt of your request for information pertaining to your need to perform an EA on the proposed low altitude training route. Enclosed please find a microcomputer database request form which must be filled out and returned to this office prior to the exchange of any data gathered as a result of this request. Please refer to your letter of December 7, 1989 in the section asking you to describe the information you desire. I have already begun gathering the requested data so not having this request filled out will not delay me in that regard but I would ask you to return it as soon as possible. Thank you for your attention to this matter.

Respectfully,

David C. Lovell
Habitat Biologist
Colorado Division of Wildlife
2126 N. Weber
Colorado Springs, CO 80907

STATE OF COLORADO
Roy Romer, Governor
DEPARTMENT OF NATURAL RESOURCES
DIVISION OF WILDLIFE
AN EQUAL OPPORTUNITY EMPLOYER
James B. Ruch, Director
6060 Broadway
Denver, Colorado 80216
Telephone: (303) 297-1192

REFER TO

28 December 1989

Melissa J. Mooney
Senior Biologist
SAIC
1421 Chapala Street
Santa Barbara, CA 93101

Dear Ms. Mooney:

Enclosed are the Wildlife Resource Information System(WRIS) mylar overlays as you requested for the following species:

Pueblo County	Huerfano County	Las Animas County
Pronghorn Antelope	Pronghorn Antelope	Pronghorn Antelope
Golden Eagle	Golden Eagle	Golden Eagle
Bald Eagle	Bald Eagle	Bald Eagle
Peregrine Falcon	Peregrine Falcon	Mountain Plover
Prairie Falcon	Prairie Falcon	Bighorn Sheep
Mule Deer	Bighorn Sheep	
Shore Birds		
Geese		
Ducks		

Currently, very little mapped information exists for that portion of the flight corridor in Prowers and Baca counties. I would suggest you contact Jenny Slater, Terrestrial Biologist in Lamar (719-336-4852) for species specific information you might need for those counties. All enclosed overlays were plotted at 1:250000 scale. Included under separate cover are definitions of mapped features, disclaimers, and scenarios for available species. These should be referenced when using the overlays. It is important to note that the species maps are being provided to SAIC by the Division as a service to assist SAIC in compiling an Environmental Assessment. This exchange of information should in no way be construed as a consultation by the Division and SAIC regarding assessing impacts to the wildlife resource as a result of this project proposal. If such a consultation is desired please feel free to contact us.

Also under separate cover please find a bill. If you have any questions regarding the information provided to you feel free to contact me at (719)473-2945.

Sincerely,

David C. Lovell
Wildlife Biologist/WRIS Biologist
Southeast Region
2126 North Weber
Colorado Springs, CO 80907